Commodore S. B. Egan of Buffalo at the wheel of his Fisher Trophy Winner, Rainbow.

MOTOR BOATING
119 WEST 40TH STREET
NEW YORK

CONTENTS
for NOVEMBER *1921*

VOLUME XXVIII, No. 5

SO great is the interest being shown in next year's races that the dates have already been fixed for a number of next season's big events. As for a number of years past, the first events of the year will take place at Miami, Florida. Both the Fisher-Allison and the Wood-Fisher Trophies will be competed for this winter at Miami. The dates agreed upon are March 2, 3, and 4 for the Fisher-Allison event and March 7, 8, and 9 for the Wood-Fisher Trophy.

The usual cruiser races will be held in the south this winter also. On February eleventh the cruiser race from Miami to Palm Beach and return will take place. On February eighteenth a cruiser race is scheduled from Miami to Key West. On Saturday, February 25 a new race is scheduled from Miami to Havana, Cuba, for a trophy offered by some of the most prominent citizens of Cuba.

The first big events of next summer's program will be held at Chicago in connection with the Pageant of Progress. Two weeks of racing is planned for July 24 to August 5. Next summer's races for the Fisher-Allison Trophy will be held at Hamilton, Ontario, August 17, 18 and 19. The Detroit races will be held from August 26 to September 5, 1922 that will include events for the Gold Cup, the Wood-Fisher Trophy and a number of other events that the Detroiters are planning.

It is quite probable that the American Power Boat Association will take action at its annual meeting in New York City which will be of quite a radical nature but should be such as to stimulate interest in racing. It is planned that the 1922 race for the famous Gold Cup which has been raced for, annually, since 1909, will be open to small displacement boats of a limited piston displacement and hydroplanes barred entirely. If the plans go through, it is highly probable that between fifty and one hundred boats will face the starter at the Gold Cup races. It is proposed to make the race open to displacement boats of not less than 25 feet in length and powered with a motor of not more than 625 cubic inches piston displacement. This will take in such motors as the 4-cylinder, 5¼ x 7 inch; 6-cylinder, 4½ x 6 inch; and 8-cylinder, 4 x 5 inch sizes, of which there are a number of different makes and models on the market, besides many other makes approximating these sizes.

MoToR BoatinG believes that if the contemplated changes are put through it will be the greatest step forward in racing which has been accomplished in many years and it will mean a decided revival in racing among owners who cannot afford the expensive mile-a-minute boats of which there are only two or three in the lime-light today.

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The 42 Footer

The Spell of the Tropics

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The Great Lakes
Special Florida Model

is an ideal 42-foot craft in which to take full advantage of the undreamed beauty of Florida waters. It possesses ample accommodations—a well-equipped galley, luxurious forward cabin which comfortably sleeps four—full head-room engine compartment and a commodious cockpit. It is equally well suited for large day parties or long cruises. The speed is 24 miles per hour.

We can make immediate shipment so that you may have your boat ready for you upon your arrival in Florida.

May we send our latest bulletin, No. 205, on the 42-footer, and No. 334 on the 54-footer?

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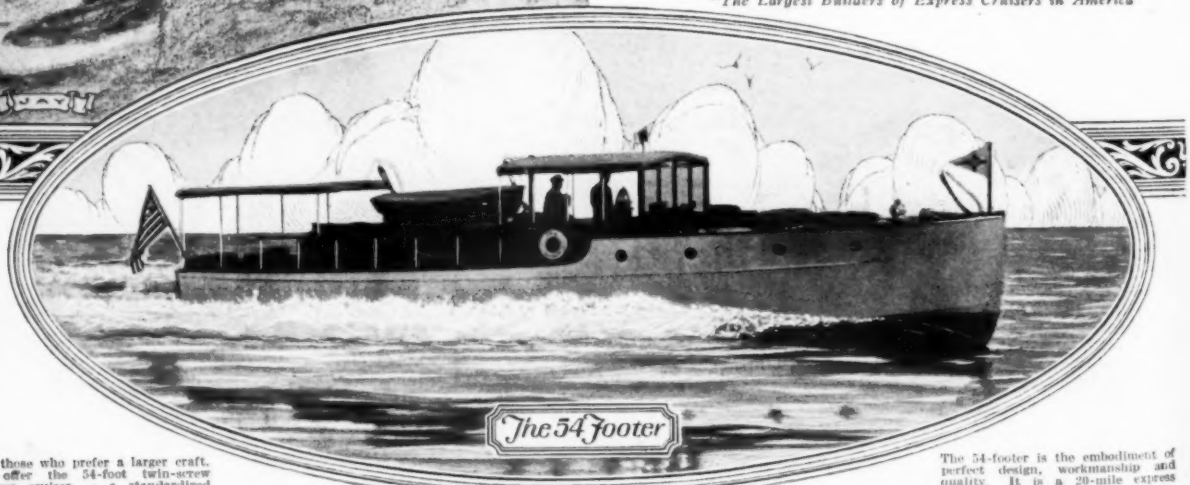
Milwaukee **Wisconsin**

"The Largest Builders of Express Cruisers in America"



The 54 Footer

For those who prefer a larger craft, we offer the 54-foot twin-screw express cruiser — a standardized cruiser of established merit.

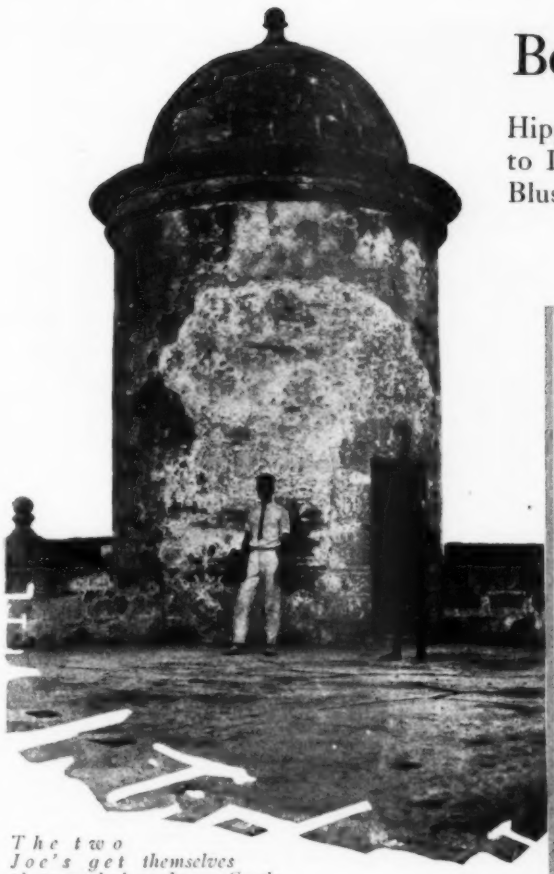
The 54-footer is the embodiment of perfect design, workmanship and quality. It is a 20-mile express cruiser with real accommodations.

Advertising Index will be found on page 104

Beating Up to Windward

Hippocampus Makes Poor Time Going From Island to Island in the West Indies—A St. Hilaire Sight Blushingly Displayed for Sharks to Pick to Pieces

By Alfred F. Loomis



The two Joe's get themselves photographed at Jagua Castle, Cienfuegos

Kind friends took us for a swim on the beach at Port Antonio, Jamaica. Squibb is in the small boat alongside

HAVING, by the timely use of the motor, dodged a waterspout which threatened us with destruction, we three members of the tribe of Hippocampus—the redoubtable Joe Squibb, the loquacious Joe Chambers, and my humble self—looked hopefully for better things in the weather line. It had taken us twelve days to cover but little more than 300 miles, and we had experienced every variety of calm from the flat, motionless kind to the sort that stands you on your beam ends and makes you gnash your teeth at the useless, slatting sails.

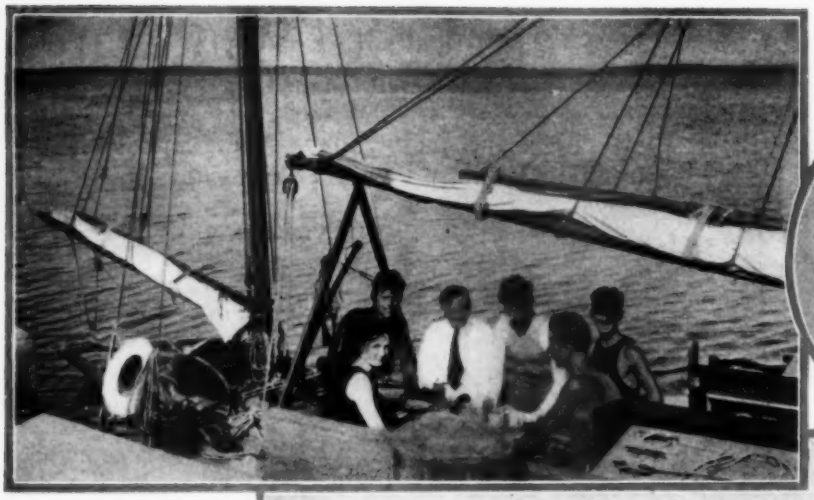
We had had our share of squalls and rain, we had found the wind an adept at shifting from northeast to southeast, depending on whether we wanted to sail toward these points—and we had come to the conclusion that the time to cruise in Cuban waters is not July. Moreover, we had watched available time and money slip away from us and we had commenced to entertain the idea of terminating our travels in Panama.

But at the moment of avoiding the waterspout we thought only of putting greater distance between us and the wicked-looking mass of clouds that had spawned it. To that end we shut off the motor and took steps to cure the missing that had given us palpitation of the heart while we were running away from the sea monster. By experiment I learned that one set of dry cells was weak, and for these I substituted a new set; by inspection I found that the timer had become fouled through the use of too great a quantity of oil. This also was replaced. At the suggestion of Chambers (whose words were lent greater weight by the parenthetical remark that the wind was then blowing toward us from the cloud bank) I squirted kerosene into the carbureter with the motor running and partially cleansed the cylinders of carbon. By these means and by the use of sanctimonious words judiciously misapplied we were presently under way to the tune of a rhythmic exhaust.

The skipper takes a sight under unusually comfortable conditions

The storm center receded into the distance as we motored east, still sending its lightnings into the sea, and in time the moon emerged and lighted us on our way. For two hours we continued under power, and then, a gentle southeasterly springing up, we shut off the motor and made the best course we could in the direction of East Guano Cay, whose lighthouse is the first aid, coming from the westward, to the approach of the city of Cienfuegos.

Luck attended our landfall of this light. Up to six o'clock in the evening of July 12th we had logged only thirty miles in twenty-four hours, and I had



We swam in the shark-proof enclosure at the Cienfuegos Y. C., and then breakfasted aboard

A friendly gull inspects the mizzen truck

A quaint cluster of dwellings surrounds Jagua Castle at the entrance to Cienfuegos Bay

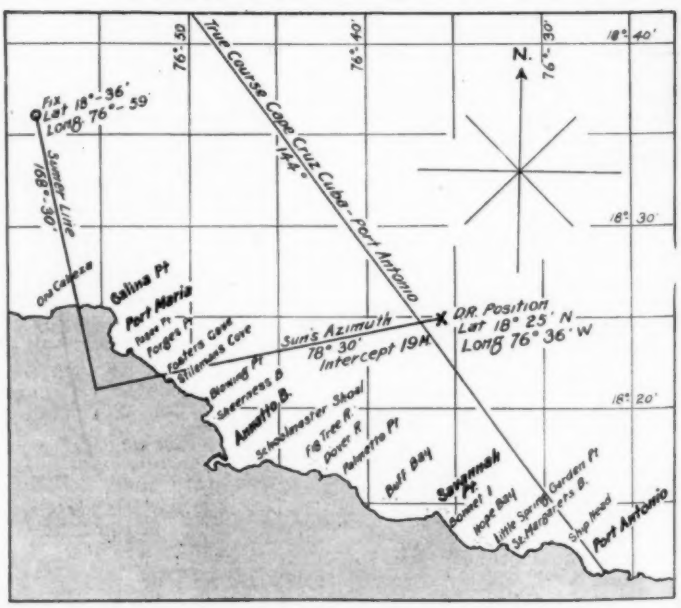
let the entire period of daylight go by without a shot at the sun. "What is the use," I thought, "of finding that we haven't moved appreciably since yesterday? Better to hope that the current has eased us on our way."

Hence, when I went off watch at midnight my idea of our position was vague. But I diligently stepped off our various courses on the chart—nineteen miles SSE, seven NNE, three S under power, ten E under power, and finally nine NNE under sail again—and assumed an absolutely unjustified dead reckoning position. It placed us twenty miles south of Jack Taylor Reef and thirty-five southwest of East Guano Cay.

I was on the point of imparting this misinformation to Chambers, who had relieved me on deck, when he sang out "Light-O." Al has the eyes of an eagle, despite the fact that he was nearly ejected from the Navy because of deficient sight, and we expect him to make all our landfalls. This was the happiest one he has ever made, for a hurried observation of the light's bearing informed me that we were only two miles from Jack Taylor Reef and ploughing directly for it. Not the light itself, but only its flash against the clouds was visible, and had we come up another mile to westward we should probably have terminated the cruise among the sharks of the reef.

This experience has taught me one thing—never to let pass an opportunity for fixing our position by celestial observation, no matter how far off shore we are or how close to an unremarkable coast. Luck doesn't always break for the small-boat sailor, and the currents, working silently and unobtrusively, may set him on the rocks before he knows it.

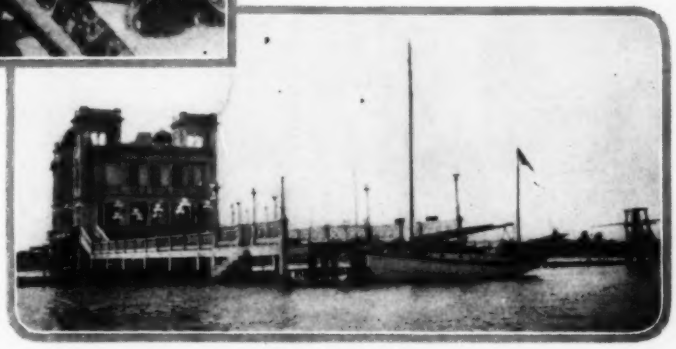
The wind had now shifted to the east, and we tacked about and headed away from the reef. Daylight found us still beating toward the Orient, the lighthouse then plainly visible; but a total of twelve hours slipped by before we had made good twenty miles and saw ourselves in a position to round the light and shape a course for Cienfuegos. Then we ran for it, taking the wind from slightly abaft the beam and with every stitch of canvas straining. It was our first experience with the full strength of the trade wind in the Caribbean, and al-



The chart work by which we fixed our position in approaching Jamaica—an illustration for the accompanying St. Hilaire sight. The intercept of 19 miles, extended along the sun's azimuth at the moment of taking the sight, cuts dry land, but the perpendicular Sumner line, in conjunction with our calculated distance from the shore, gives us our fix

Taking 'em over the bow

An extemporized trisail steadies us



Hippocampus lying at the pier of the Cienfuegos Yacht Club, Cuba

squall, which sent us to the main halliards in a hurry.

"Poor," said the skipper, when the mainsail was furled and its boom rested in the crutch. "If we can't do better than that we'll be out of luck when a real squall strikes us."

"All right," said the exec. "Let's run her up again for practice." He spoke ironically.

"Shoot," said the first luff, rubbing the pelting raindrops from his eyes; and in another thirty seconds the mainsail was again spread to the squall.

"Now down with it," said the skipper when the halliards were in order; "and don't let us shame ourselves before that spic fisherman."

Down she came, with creditable precision, and up again the gaff traveled to the throat pendant as the squall passed by and the wind slacked off. But calm immediately overtook us and we lowered away once more.

"If we razzle-dazzle the sail up and down half a dozen times for every squall," drawled Squibb, as we went below to look for books and writing material, "we'll be sailing under bare poles in about a week. Take the advice of an

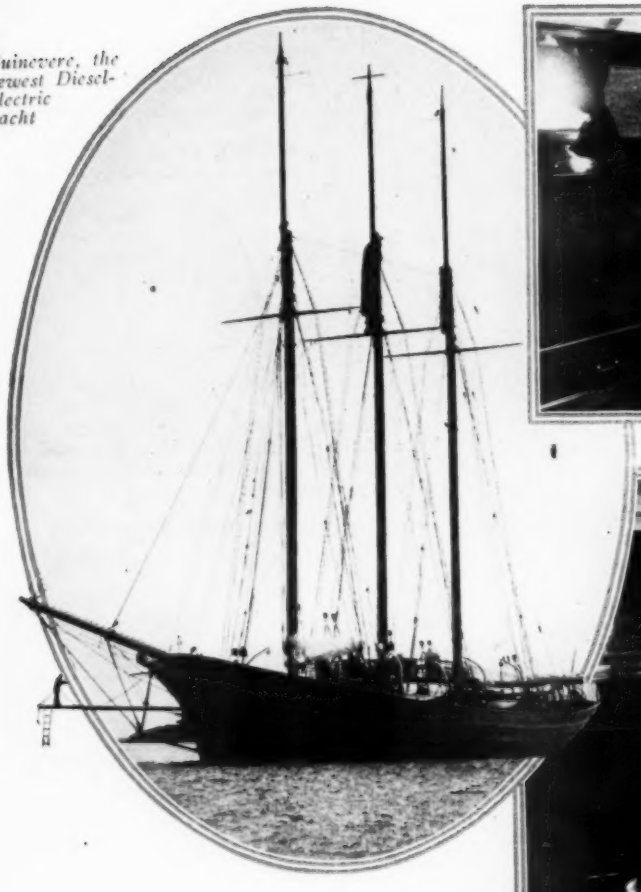
(*Continued on page 52*)

though we kept all sail spread we watched the seams carefully and were prepared to lower on the first indication of failure. But, barring a slight ripping along the seams of the mainsail where, in years past, the lee backstay had been allowed to chafe the canvas, everything held and we made knots.

Banging across the shoal that extends eastward from East Guano, and attended by some friendly gulls which took turns flying overhead to peck at our main and mizzen trucks, we enjoyed for two hours the sensation of having exactly the right amount of wind while sailing on a beeline for our destination. But presently the waves broke no more against our weather side, nor immersed the bowsprit, nor washed the lee deck from main shrouds to mizzen. We righted to a more even keel and prepared with resignation to meet the afternoon's calm. It came, ushered in by an arched

Hippocampus is a sweet boat to sail, no matter what the wind

Photographs by M. Rosenfeld



Guinevere, the newest Diesel-electric yacht

A corner of the library all trimmed in Circassian walnut

Interior view of the deck-house with stairway to saloon below

Guinevere, the Diesel-Electric Yacht

Progress in Design and Construction is Evident in Every Feature of this Newest Auxiliary Motor Yacht

CONSIDERABLE interest was aroused by the description of the auxiliary schooner Elfay which appeared in MoToR BoatinG some time ago. This vessel has cruised over 14,000 miles without trouble with either the Diesel engine or the electric propulsion machinery. In building the new schooner yacht Guinevere, her owner, Edgar Palmer, specified that the Winton Diesel electric drive be used in this boat also.

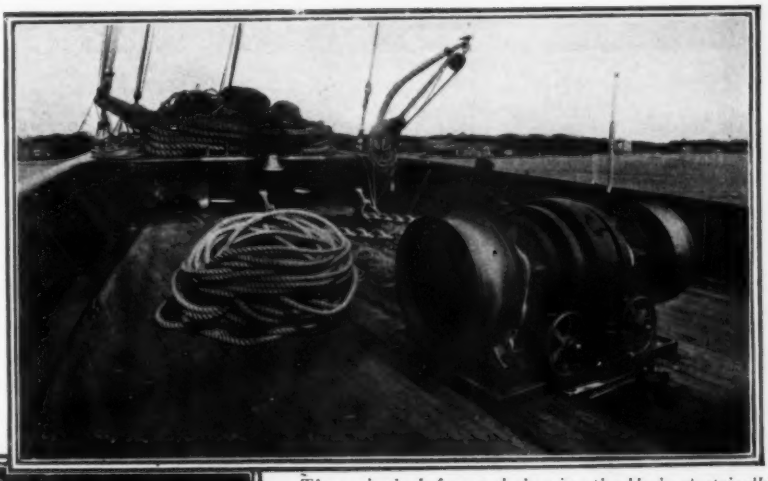
This new Diesel equipped yacht is the largest boat of this type ever built in this country and is further the largest fore and aft schooner yacht ever built in the world. The design was executed by A. Loring Swasey and the Diesel electric drive was worked out by him in consultation with Commander Fisher of the United States Navy.

The power plant of Guinevere consists of a pair of Winton Diesel engines direct connected to electric generators, the current from which is used to turn a large driving motor operating a Bevis patent propeller. This innovation in power plant engineering gives the Diesel electric drive a wonderful opportunity to operate at its highest efficiency. For running at reduced speed, one

Interior of the chart-house and radio-room

motor can be used and for full speed both motors. A large factor of safety is incorporated in this system should any repairs be necessary to one or the other of the engines while the vessel is at sea.

The entire motor power equipment was built by the Winton Engine Works and the Westinghouse Electric and Manufacturing Company. The hull with all its intricate details was built at the yards of George Lawley & Son Corporation at Neponset. The principal dimensions of Guinevere are, length over all, 195 feet; beam over all, 32 feet 5 inches; displacement, 642 tons, and speed under power alone, 11½ knots. For auxiliary purposes many varieties of electrical equipment are carried. There is a two-ton Clothel refrigerating unit, and a pair of 15 k.w. generators driven by Quayle oil engines of 25 h.p. each. All other equipment such as bilge pumps, fire pumps, service pumps, ventilating fans, hoists for both anchors and sail, wireless apparatus, etc., are operated by electric power, no steam being used on the boat.



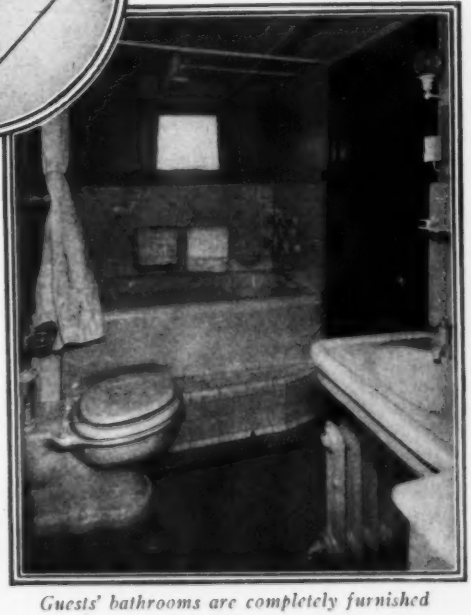
The main deck forward showing the Hyde electrically operated anchor winch

Most complete accommodations are afforded for the owner and his guests on the yacht. The trim of the interior is entirely of Circassian walnut and teak. The deck house and all joiner work above decks is also of the finest grade of teak. An unusually large dining saloon amidships extends the full width of the vessel. A large skylight overhead admits a flood of daylight and the room is very bright. All interior woodworks and furniture were designed particularly for the boat by Mr. Swasey and interior decorations were selected to match. Six large state rooms are provided with an additional one on deck which has a private stairway leading down below.

The owner's dining saloon on Guinevere

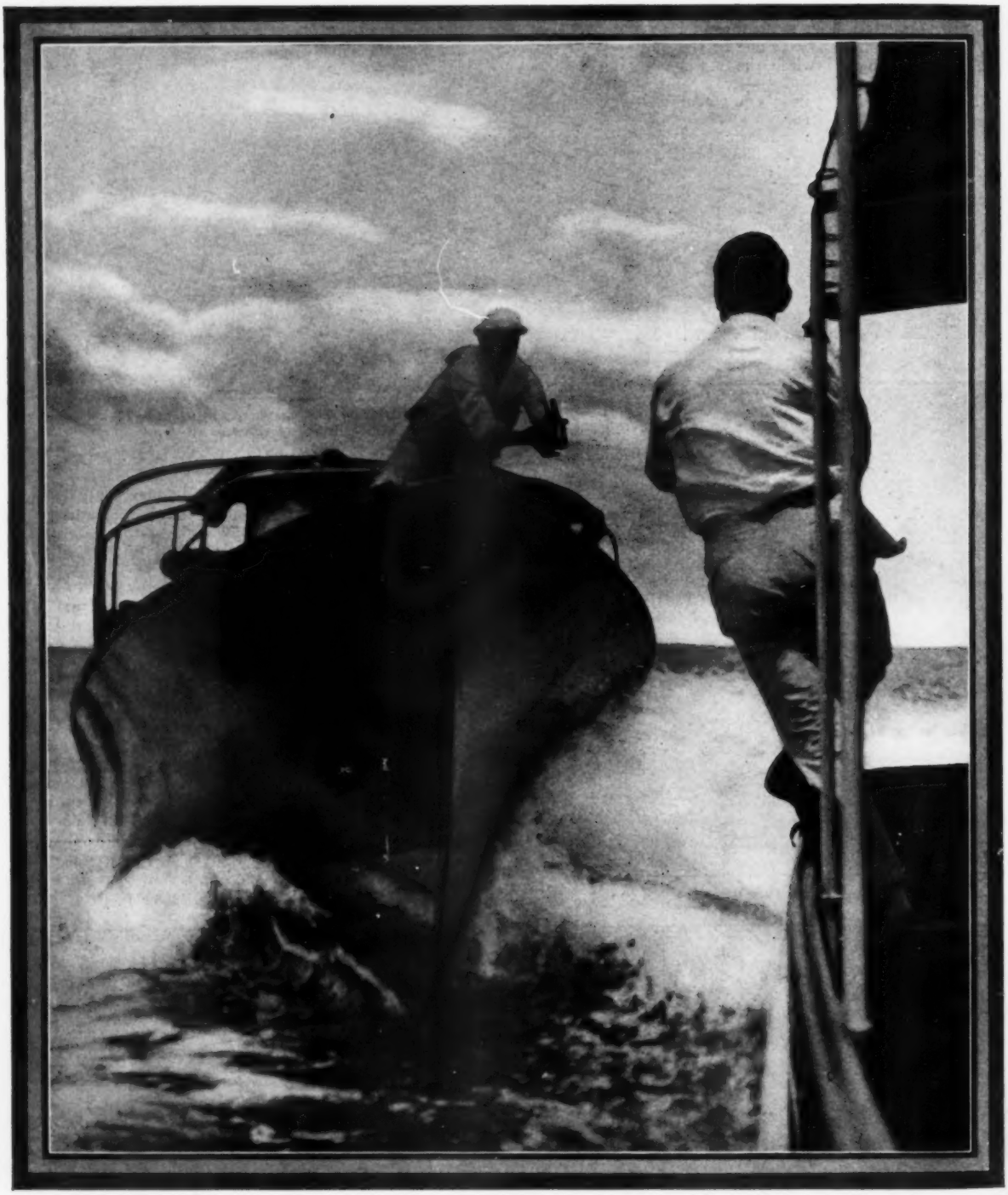
The carved figurehead on Guinevere

A small corner of the owner's stateroom



Guests' bathrooms are completely furnished

Photograph by McClintock



Beyond the Three Mile Limit

Down in the region of the Bahamas where the thermometer hovers around 105 degrees a man may still raise a thirst—and quench it. In the present instance, however, we see the starboard quarter of James Allison's L'Apache, and the bow of Carl Fisher's Shadow V overtaking the former at full speed. Jack La Gorce, associate editor of the National Geographic Magazine, is seen anxiously hanging from the awning stanchions

Rami was launched this season from the yards of J. M. Densmore Co., Boston, Mass., where she was built for S. Sprague, Portland, Maine. While not built for extreme speeds, she can cruise at 15½ knots. The trial trips consisted of a four-hour run at full speed, her two big six Sterlings turning at 1,275 r.p.m. On account of the small bore of the motors fuel economy and absence of vibration is assured

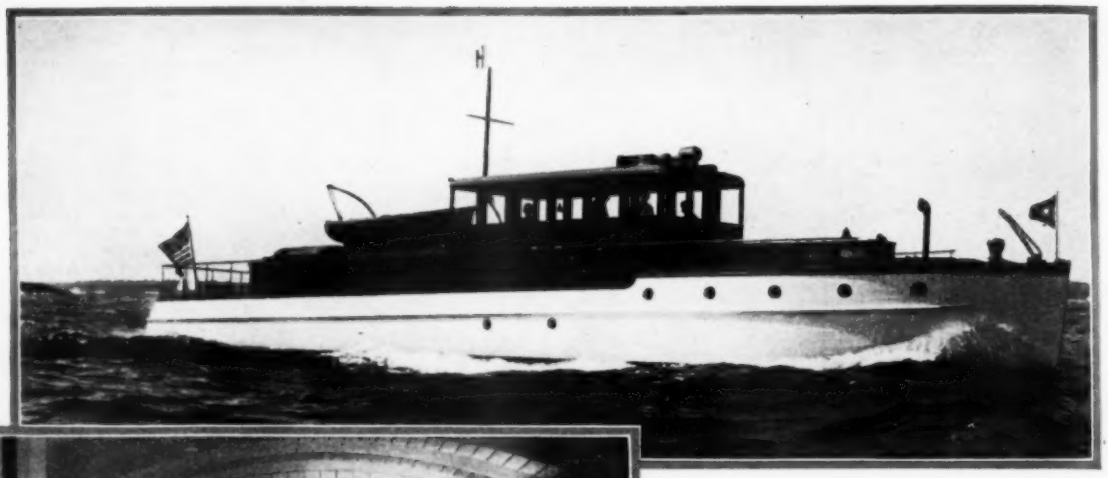
Photographs by Stebbins

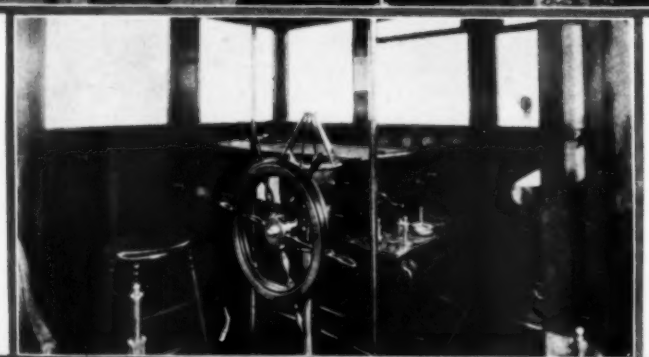
Rami, a 70-Foot Stock Cruiser

As an Example of Stock Cruiser Construction of the Present Day, Rami Takes Her Place With the Finest Yachts

As the interior view of the deck house show, Rami is luxuriously outfitted. Large and well lighted cabins suggest a revival of this wholesome type of naval architecture. The cost is not perhaps so stupendous as the appearance of this cruiser would seem to indicate, although Mr. Sprague took early advantage of a quiet season, and had his boat built at a nominal figure for the very complete and graceful cruiser in which he has cruised along the Maine coast

Model GR Sterling motors of the dual valve type are used to drive Rami. At 1,200 and over, when carefully balanced as are these motors, there is a true spinning motion and no sense of engines working. The boat glides through the water without throb or noise, carrying ten to twelve persons and crew at a minimum of fuel and oil cost per mile. Such craft compare favorably with railroad transportation in more comfortable surroundings but in almost equal traveling time





Kex II

By Frank Pembroke Huckins

WELL, the gol-darned boat-grafting job is done. The major operation was a success. The patient also recovered. In sooth, she has just returned from an eleven hundred-mile cruise to Nova Scotia. Now, as my last act before returning to find out where my wandering business is to-night, I must write that article I promised "Chap."

Some of you who do more than look at the pictures in MoToR BoatinG recall that starting with the thirty-eight-footer Kex II we threw away everything aft of the midsection and married the remains to enough more to make her sixty feet. Although we started away back in August, 1920, it was not until well into the spring that the anvil chorus had been fully mobilized. Oh, those prognostications! She will squat! She will roll over! She won't make five knots! She will be down by the head! You won't get her done in time to cruise this year! They were all there with a slight sprinkling of optimists—boosters—those good friends who predicted 20 knots and that sort of bunk. I say they were all there, at the launching—didn't want to see anybody killed, of course not, but if the balloon was going to bust they didn't want to miss a thing.

Well, we fooled them. She went over, stayed right side up, floated precisely on her designed waterline and what is more she was launched on the appointed day with the rugs down, the berths made up, ice and food in the ice chest, a fire in the galley range and—it is none of your business what was in the locker—this is my summer home. Still more surprising, all the fool contraptions worked. Put your foot on a button out forward and get a forty-foot stream to wash off the anchor as it comes up, or the decks, or for a morning shower for them what likes it cold. Turn a button on the control board and the electric bilge pump hums below. Turn another and

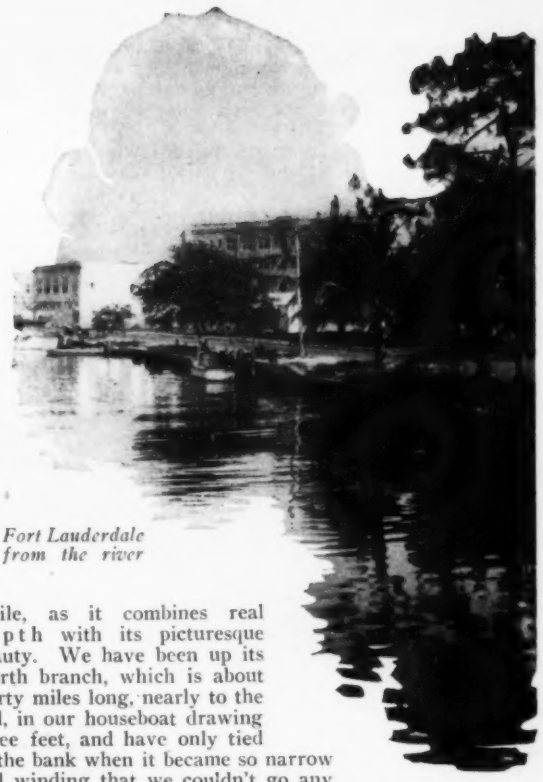
(*Continued on page 98*)

Upper view: Owner's room looking forward. Center view: Deck house, chart table, controls, etc. Lower view: Forward saloon, looking aft

The By-Ways of Florida

Many Natural Winding Waterways of Great Beauty Provide New Thrills for the Inquisitive Cruiser

By E. F. Willoughby



Fort Lauderdale from the river

WHILE much has been written about the highways of Florida East Coast water travel, little, if anything, has been said of the number of interesting side trips, day trips, that one can take if one has the time, coupled with a desire to see Nature in her loveliest, and natural raiment. There are no doubt hundreds of such trips; many I have not taken, and doubtless many that I have taken, the beauties of which I shall try to visualize to those who read this, have been worth real trouble to take, though all are easily accessible, being more or less part of what is the main highway of water travel in Florida, the East Coast Inland Waterway.

The most northern by-way that I happen to have taken is the Tomoka River. Anchored at Ormond, we took the launch and went up the Halifax River to the canal, but very soon branched off into the Tomoka itself, a natural winding waterway of great beauty, becoming very narrow. The shores are closely matted with vegetation, and often as I have been up here, I have never failed to see alligators on the banks, and in one memorable instance, a big mother 'gator was sunning herself, and literally swarming with baby alligators, who were crawling all over her, this way and that, and resembling a very active ant's nest more than anything else. We tried to see into the water, but its inky blackness hid any secrets that it held exceedingly well, and we had to be content with imagining the fish that lived under its surface.

We made a landing on the left shore, at a nice cleared spot, evidently a picnic spot of long standing, and ate our basket lunch undisturbed by the wood-noises we heard from time to time. Rustlings in the underbrush all around us, croakings of big blue herons that we caught occasional glimpses of, and all sorts of bird sounds in the branches overhead, made music of a kind seldom had with meals. After luncheon we continued up the river, a little further, but finally had to head homewards, glad that we had encountered none of the excursionists who, in season, make this trip frequently, and mar its beauty with their noisy chatter. Another very beautiful river is the St. Lucie, which terminates at the St. Lucie Inlet, and if you have never been up here, you have missed something really worth while, as it combines real depth with its picturesque beauty. We have been up its North branch, which is about thirty miles long, nearly to the end, in our houseboat drawing three feet, and have only tied to the bank when it became so narrow and winding that we couldn't go any further; even then we had probably over ten feet of water beneath us, and in some instances twenty, they say.

Both the north and south branch forks of the St. Lucie River terminate at Stuart, about five miles from the inlet, and while the south fork is very beautiful, the north fork, to my mind, is the best. Leaving Stuart, after having gone through the drawbridge here, bear to the right (north) and go through a waterway which is fairly deep, keeping in the middle with the exception of a place where a shoal bears off from an island, about two miles up, at which point you have to follow, close in, the left shore. After entering the narrow part, just beyond, you cannot easily get lost, though several times branches come in from the left and are apt to be misleading. But the river follows almost all right-hand turns, the only exception, as I remember, being a sharp left at what is known as Jewfish point, which bears a sign with the name on it, and a pointer. The prettiest part of the river is here, and the river banks are covered with dense and very tropical foliage. Palmetto trees in great profusion, some of them coming out from the bank at right angles, and parallel to the water for ten or twenty feet. One wonders at roots that can hang on to the extent that some of these do. Air plants, or wild orchid, are thickly crowded on some of the trees, in some instances having killed the oaks they are on, which they unfortunately do in time, as they spread very fast and literally absorb the life of the tree.

There are alligators up here, but never many to be seen, but all kinds of birds are here, and on almost all stumps of trees close to the water one sees turtles of all sizes, which flop into the water as you draw near, however. In one or two pools one very frequently sees tarpon rolling, for they come up this

Seminole Indian village near Fort Lauderdale

river to spawn, and several very large tarpon have been caught up here in the spring, though they are very shy of the bait. Mosquitoes may be had up here if you anchor for the night, but if you are well screened they will not bother you.

Another day trip from Stuart, on the inlet, this time over land partways, is inland, due west, to Lake Roebuck. We took this trip with a man who kept a boat at the lake and used to go often for freshwater bass, and while we didn't actually catch any bass that day, we had a beautiful and most interesting trip and felt amply repaid for the trouble. What resembled an old prairie schooner met us at what is now called Port Sewall, on the mainland abreast of the inlet, also two old nags (I could hardly call them anything else) for the men to ride. We, of the gentler sex, got into the wagon with all the lunch and fishing tackle and other paraphernalia, and in a short time proceeded to travel over land which should have been dry as a bone but was almost inundated owing to recent frequent rains. At times the animals would be knee deep in mud and water, and we had to go at a walk most of the way. We reached the shore of Lake Roebuck at about eleven o'clock, I think, and had to hunt for the boat, which, when found (cached in a new place by someone who had evidently borrowed it), was discovered in a badly leaky condition, so much so, in fact, that we had great difficulty, one by one, in reaching the picturesque little island, about 200 feet distant, without sinking in midstream, and a good deal of the food got much damper than it should to be palatable. After lunch, which we ate sitting on some fallen logs on this little island, we explored a bit, and, as it was such an unfrequented spot, found all manner of interesting things to see. Only twenty feet from where we had eaten our lunch was a blue heron's nest, about a foot over the water, in the branches of a scrubby tree which partly overhung the water. In it were three beautiful eggs, robin's-egg blue, and about the size of a duck egg. We never saw the mother, but I have no doubt that she was watching us from a safe distance, with fear in her heart. Most of the trees here were pine, though there were some oak and a few palmetto. We were all tired when we got home that night, the men particularly, after their riding, but we had certainly enjoyed our day.

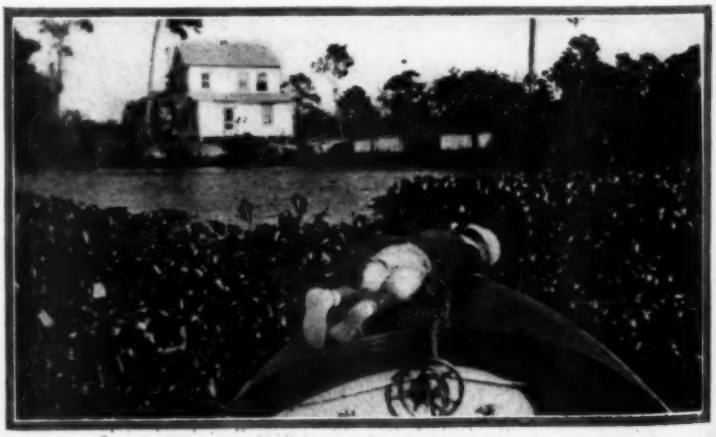
Probably the most beautiful river in Florida, and possibly one of the least known, is the Loxahatchee at Jupiter. As a matter of fact, most people probably think it is inaccessible; it certainly looks so, though after you have negotiated the oyster-barred entrance, you have several feet of water. There is a marked channel, which bears straight away from the right side of the drawbridge, and all you have to do is follow the stakes, avoiding a right-hand branch that comes pretty quickly, and which looks like the main river, with its homes on the shores and a wide stretch of water. Keep right on by here, bearing slightly right in an equally wide reach ahead, where are a few more stakes over a bad spot with oyster beds and sand flats, and the narrowest possible channel through. Once by here, sharp left, and you are in the river proper, though it does not become narrow until you have left an old dredge wreck behind, and turned to the right into a lead that appears to have no outlet, though you come upon it all right in what looks to be a dense forest growth ahead. From now on you will believe yourself in a fairyland.

The upper and wilder part of the New river

Seminole Indians in transit

Cypress trees, bigger than any you have probably ever seen before, are thick on either hand, festooned with moss, and a tangle of other growth so dense that you cannot see into it. It is a very winding river, and becomes very narrow; sharp bends each more lovely than the last, with maybe a palmetto tree, growing parallel to the water, or a particularly

(*Continued on page 70*)



Parting the water hyacinths in the New river

More Practical Questions for Motor Boatmen

Questions for MoToR BoatinG's Correspondence Course, Lesson No. 9, Navigating Instruments, Lead and Lead-Line, the Log, the Chronometer, Course Protractor, etc.

Published in October MoToR BoatinG

(Answers should be sent to the Editor of MoToR BoatinG, 119 West 40th Street, New York, N. Y.

ENROLLMENT in MoToR BoatinG's Correspondence Course in Seamanship, Piloting and Small Boat Handling is still open to all those who wish to enroll.

In each issue of MoToR BoatinG beginning with the last February number there has been or will be an article covering some branch of the subject. Each of these articles will form a lesson in the Correspondence Course and in the issue following the issue in which the particular lesson is printed there will be published a number of questions relating to the subject covered in the lesson.

Those enrolled in the course submit their answers to these questions at any time convenient to them. The answers are submitted by us to the examiners. The names of those who successfully pass the questions by at least 80% are published in a subsequent issue of MoToR BoatinG.

After the publication of the last article or lesson, those who have submitted answers to each lesson and have been successfully passed by the examiners, will be entitled to a MoToR BoatinG's Pilot Certificate suitable for framing, signed by the examiners and the Editor of MoToR BoatinG, certifying that the one in whose name the Pilot Certificate is issued, has successfully passed the requirements.

All that is necessary for you to enroll is to send your name at once to the Editor of MoToR BoatinG. There is no charge now or later. We have made reprints of a number of the Correspondence Course earlier lessons and have a limited supply of back numbers containing the others. We should be glad to send a complete set of the first nine lessons free of charge to any new subscriber whether he is enrolled in the Course or not.—EDITOR.

CORRESPONDENCE COURSE QUESTIONS

1. What navigating instruments should be carried aboard a small cruiser?
2. How is the depth corresponding to two fathoms marked on the lead-line?
3. How is the depth corresponding to three fathoms marked on the lead-line?
4. How is the depth corresponding to five fathoms marked on the lead-line?
5. How is the depth corresponding to seven fathoms marked on the lead-line?
6. How is the depth corresponding to ten fathoms marked on the lead-line?
7. What depths are indicated by three strips of leather?
8. What depths are indicated by a white rag?
9. What depths are indicated by a red rag?
10. What depth is indicated by two knots?
11. What depth is indicated by three knots?
12. What depth is indicated by four knots?
13. What depths are indicated by one knot?
14. What is meant by "marks"?
15. What is meant by "deeps"?
16. What is meant by "arming the lead"?
17. Does the patent log indicate distances in statute or nautical miles?
18. In using the Chip log, if 73⅓ feet of line flow over the taffrail in five seconds, what is the speed of the boat through the water?
19. If, when using the ground log, 88 feet of line pass over the taffrail in five seconds, what is the speed of the boat over the bottom?
20. If the observations mentioned in questions 18 and 19 were taken simultaneously, what would be the speed of the current?
21. Would the current mentioned in example number 20 be fair or head?
22. An observation taken with a pelorus which is set with the boat's compass which has a deviation of one point west shows SW. What is the magnetic bearing?
23. If the bearing of an observation taken by the pelorus which is set with the boat's compass which has a one point east deviation is NE by E, what is the true bearing in the location where the variation is ½ point west?
24. A patent log shows the following readings: 10 A. M. 2.75, 10.30 A. M. 5.25. What is the speed of the boat?
25. A patent log shows that it requires 7½ minutes to cover one mile. What is the speed of the boat?
26. Are patent logs absolutely accurate?
27. What care must be taken in the use of patent logs in reference to the distance which the rotator should be towed from the stern of the boat?
28. What conditions are likely to cause patent logs to give inaccurate readings?
29. What is a chronometer?
30. What is meant by the chronometer rate?
31. New York City is located in longitude 74 degrees west—Peoria, Illinois, in 89 degrees west. When it is noon by suntime in New York City, what time is the suntime in Peoria? (Omit any considerations of the equation of time.)
32. Portland, Maine, and New Bedford, Mass., are both located in approximately 70 degrees west longitude. However, the latitude of Portland is 43 degrees north and the latitude of New Bedford is 41 degrees north. Is there any difference in suntime between these two cities?
33. With a short piece of line of about ⅜" in diameter put an eye splice in one end. (This splice should be forwarded under separate cover, marked by a tag with the student's name thereon.)

(*The names of those who have passed papers submitted during September will be found on page* 86)

Subjects Covered In Various Lessons

Lesson No.

1. Rules of the Road, Rights of Way, Proper Whistle Signals, Duty when Underway.
2. Types and Classes of Motor Boats and other Power and Sailing Vessels, Lights for All Classes of Vessels.
3. Navigation and Government Lights, Lighthouses, Lightships, Range Lights and their Characteristics and Classification, Aids to Navigation.
4. Buoys of Various Types. Colors and Numbers, Uses and Meaning. Can, Nun, Spar, Bell, Whistling, Lighted and Combination Buoys. Starboard and Porthand Buoys, Channel, Obstruction, Anchorage and Turning Buoys.
5. Equipment Required by Law for Various Types of Boats, International, Inland, Pilot and Motor Boat Rules and Regulations, Government Publications, the Light and Buoy Lists, Tide Tables, Coast Pilots, Notice to Mariners.
6. The Compass.
7. Variation, Deviation, Magnetic and True Courses, Compass Errors and their Application, Various Methods of Determining Compass Errors, Leeway.
8. The Chart, Various Kinds of Charts, Where to Obtain Them, Their Use, Various Markings on Charts, etc.
9. Nautical Instruments, the Log and Lead Line, Sounding Machines, Pelorus, Azimuth, Protractor, Parallel Rules, etc.
10. Piloting and Chart Work, Laying Courses, Determining Position by Various Methods, Allowing for Tides and Current Danger Angles.
11. Small Motor Boat Handling, Steering, Engine Room Signals, Action of Propeller, Action of Winds and Current, Shallow Water Indications, Tide Rips, Head, Beam and Following Sea, Picking up Mooring, Making Landings at a Float and Wharf, the Dinghy, Landing in a Surf, Navigation in Fog, Crowded Waters, Anchoring, Docking, Practical Aids in Boat Handling.
12. Cruising, Proper Equipment to Carry, Keeping a Log, Sun and Clock Time, Duties of Various Members of Crew.
13. Flags and Colors, Yachting Etiquette, Signalling.

Finding One's Way About In A Motor Boat

How to Navigate Strange Waters With a Feeling of Safety and Security

Piloting—MoToR BoatinG's *Correspondence* Course, Lesson No. 9

By Charles F. Chapman

(See page 86 for names of those who passed examinations in September.)

Fig. 207—*The sounding machine which on large boats replaces the lead and lead line. The sounding machine permits of faster and more accurate soundings being made while the boat is moving through the water. It consists of a reel of strong wire mounted on a suitable stand and a controlling brake. A lead is attached to the outer end of the wire above which is a cylindrical case containing the depth registering device. In this a glass tube is used sealed on one end but open at the other. The inside of the tube is coated with a chemical substance which changes color upon contact with sea water. As the cylinder sinks deeper and deeper in the water the water rises in the tube. The distance the inner part of the tube is discolored is the measure of the depth of water*

THE practice of Piloting is a fascinating pastime. It is a pleasing game where the results if satisfactory are a source of enjoyment, but if the deductions and judgment be in error may lead to disagreeable consequences. Thus a stake is placed for the participator in coastwise piloting to compete for. So many motor boat men run haphazard along the coast depending on the sight of familiar landmarks and good luck for a position that a few words on the subject may be found profitable.

The instruments used in Piloting, as mentioned in the last lesson, besides the compass, are mainly the lead, log and some device for taking bearings. Usually a simple contrivance fitted with two sight vanes that fits on the compass is all that is necessary in small vessels. In larger boats a pelorus may be found. This is a brass plate engraved as a compass, capable of being so turned as to set it on the heading of the boat. There is a set of sight vanes fitted to revolve on the face of the dial, and the whole is supported on a standard. Sometimes instead of a brass plate ground glass is used with the compass painted upon it in black; in such peloruses an electric light is placed beneath the dial to facilitate its use in night work. The sextant is often found to be of use in taking angles.

There are many different methods for finding a boat's position, depending upon the number of objects in sight, their bearing relative to the heading of the vessel, and the character of the bottom and depth of water.

The most commonly practised method is known as the "Four-Point Bearing" (Bow and Beam to some). (See Fig. 210.) It is a standing order on all well navigated vessels that no lighthouse be passed without taking a four-point bearing. The log reading is noted when the lighthouse (or other charted landmark) is four points (45°) on the bow and the same course is held until it bears abeam when the log is again read. The distance run between bearings is the distance off the lighthouse when abeam. Care must be exercised in ascertaining the distance run over the bottom. If a current should be against a vessel the log will show more miles than have been made and vice versa, if a fair current is experienced more miles will be made over the bottom than the log indicates. It is the distance made over the bottom that shows us our distance off the light. Many vessels have been stranded on the Florida Reefs through miscalculation or no calculation of the Gulf Stream current when using the four-point bearing.

Fig. 208—*Taking a sounding with the lead and lead line. On the larger boats platforms for this purpose are provided*

The diagram (Fig. 210) shows a right triangle with an angle of 45° known, and a side given. It is a mathematical fact that all three angles of a triangle always add up to 180°, and as we have here two angles equal to 135°, it clearly shows that the third angle must be also 45°. It is a well known theorem that the sides of a triangle opposite equal angles are equal. Hence it will be seen that the distance run is the same as the distance off the lighthouse. This problem is likewise applicable to what is called a "Beam and Quarter Bearing." Here the distance run from the time the lighthouse is abeam until it is four points abaft the beam is the distance off when it was abeam. This information is a little too belated to be of much value.

A simple expedient is used on some steamers to take these four-point bearings, that can be adapted to motor boats and found very convenient. A round head brass screw is set in the upper edge of the 'midship sash of the pilot house windows, very conveniently in front of the eye when the

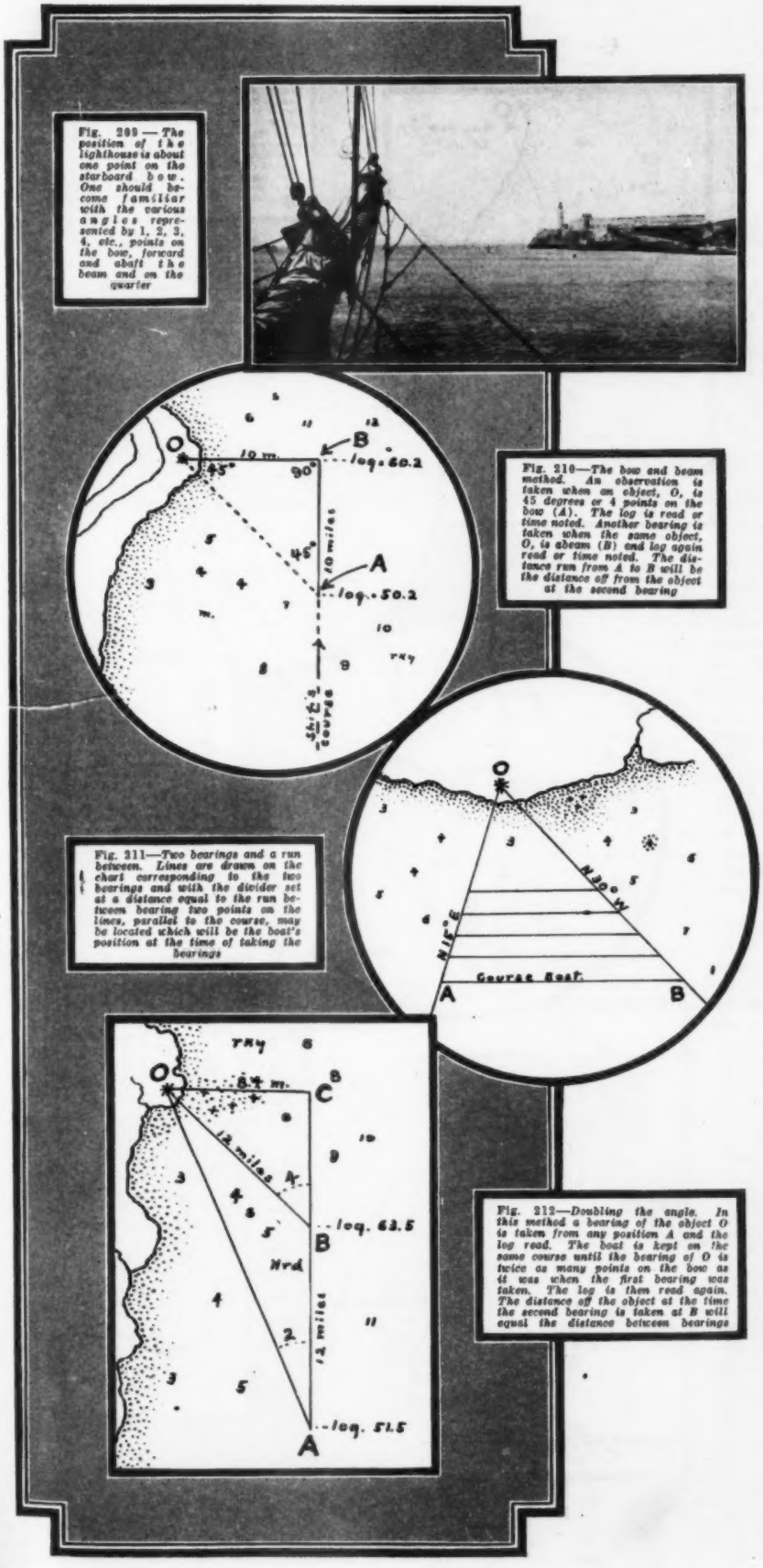


Fig. 209 — *The position of the lighthouse is about one point on the starboard bow. One should become familiar with the various angles represented by 1, 2, 3, 4, etc., points on the bow, forward and abaft the beam and on the quarter*

Fig. 210—*The bow and beam method. An observation is taken when an object, O, is 45 degrees or 4 points on the bow (A). The log is read or time noted. Another bearing is taken when the same object, O, is abeam (B) and log again read or time noted. The distance run from A to B will be the distance off from the object at the second bearing*

Fig. 211—*Two bearings and a run between. Lines are drawn on the chart corresponding to the two bearings and with the divider set at a distance equal to the run between bearing two points on the lines, parallel to the course, may be located which will be the boat's position at the time of taking the bearings*

Fig. 212—*Doubling the angle. In this method a bearing of the object O is taken from any position A and the log read. The boat is kept on the same course until the bearing of O is twice as many points on the bow as it was when the first bearing was taken. The log is then read again. The distance off the object at the time the second bearing is taken at B will equal the distance between bearings*

sash is down. At just 45° from the bow is a belaying pin opportunely placed in the rail. When the lighthouse is in range over the screw head and the belaying pin the log is read or the time noted, and the distance calculated until the lighthouse is in range between with the pilot house doors, or along an athwartship bulkhead. Such a contrivance could very easily be fitted on any motor boat.

It often becomes desirable to get a position, or at least an approximation, when a four-point bearing is not available. A single bearing of an object laid down on the chart shows the mariner that he is somewhere on this line. A sounding taken at the same time will, if the shore is shelving uniformly, give a good approximation of the position.

With a single object in sight another method known as two bearings and the run between, for lack of a better name, is sometimes resorted to. (See Fig. 211.) In such a case take a bearing of the object, read the log, and after an interval, during which the course has not been changed, and the bearing has changed not less than 30°, again read the log and note a second bearing. Lay both bearings on the chart, take the distance run on the dividers, and holding the points always in the direction of the course from each other, carry them in between the bearings until their convergence brings the points of the dividers each on a bearing line. These points will indicate the first and second positions of the boat. Remember it is always the run over the bottom that is used, and if current is against or with the boat the log distance must be respectively decreased or increased.

There is a method known as Doubling the Angle on the Bow (see Fig. 212), where the bearing is taken a certain number of degrees off the bow, say 20°, and again when 40°, noting at the same time the run between them. As in a four-point bearing the distance run is the distance off the light or other object at the time of taking the second bearing. This is valuable in that it gives the position before the light is abeam and in case shoals or ledges lie off, it is most desirable to know the position before reaching them.

This problem furnishes the navigator with further valuable information (provided he uses two points and four points on the bow) (Fig. 212) in that if he takes 7/10 of the distance run it will be the distance the boat will pass the light when abeam. This is called the Seven-tenths Rule.

In fact, there are some very convenient sets of bearings having such a relation to each other that the run between them will equal the distance the object will be passed. To illustrate—if the light-

house at the first bearing be 22° and at the second 34° the distance shown by the log (current corrected) between them will be the distance off the light when abeam. So it is with 25°-41°, 27°-46°, 29°-51°, 32°-59°, 40°-79°, and 44°-88°.

Should by any chance it have been desired to get the distance when too late for a four-point bearing, note the log when the object bears 26½° forward of the beam and again when 26½° abaft the beam, the distance run will be the distance off when it was abeam. Or if an approximation is sufficient read the log when the object bears two points forward of the beam, and again when abeam. Multiply the distance run by 2½ to get the distance off. By similarly taking a bearing when the light is one point forward of the beam and multiplying the run by 5 a fairly accurate distance off the light is obtained.

All that has been said refers to the problem of locating a boat when one object is visible. Should two objects be available the method of cross bearings (see Fig. 214) is most practical, for the position is given immediately without waiting during a certain run. The objects should be hardly less than 30° apart and the nearer 90° the better results. The procedure is to take a bearing of each object as quickly as possible, correct for deviation if the compass rose diagram on the chart is magnetic, and also for variation if it is a true diagram, and lay them down on the chart. The boat is somewhere on each of these lines or bearings and hence must be at their intersection. This is an accurate method, but a mistake might not be detected, so if a third object be in sight, a third bearing passing close to or through the intersection of the other two, makes an absolutely correct position.

There is a wrinkle known as a Danger Angle (see Fig. 215) which is a very useful method of insuring safety in passing a dangerous rock. There must be two charted objects in sight and properly located in relation to the shoal or rock. At a safe distance off the rock make a dot on the chart, and draw a line from it to each object, the light and the church in the diagram. An ordinary protractor will measure the angle between the lines which is the danger angle. If the vessel gets in closer to the rocks than the point of safety the angle will become larger and if farther away will become smaller. Hence it will be seen that as soon as the angle becomes greater than 80° (Fig. 215), the vessel should be hauled out. If the angle between the objects is not allowed to get larger than 80° the vessel is bound to clear the rock.

Sometimes a Double Danger Angle is used where another rock exists outside the first and it is necessary to navigate between them. In such a case the vessel is protected from the inner rock by a danger angle as shown above. Inside the outer rock at a safe distance a point is set down and by drawing lines to each object another danger angle is established. While the first angle is not allowed to get any larger this second angle

(*Continued on page 22*)

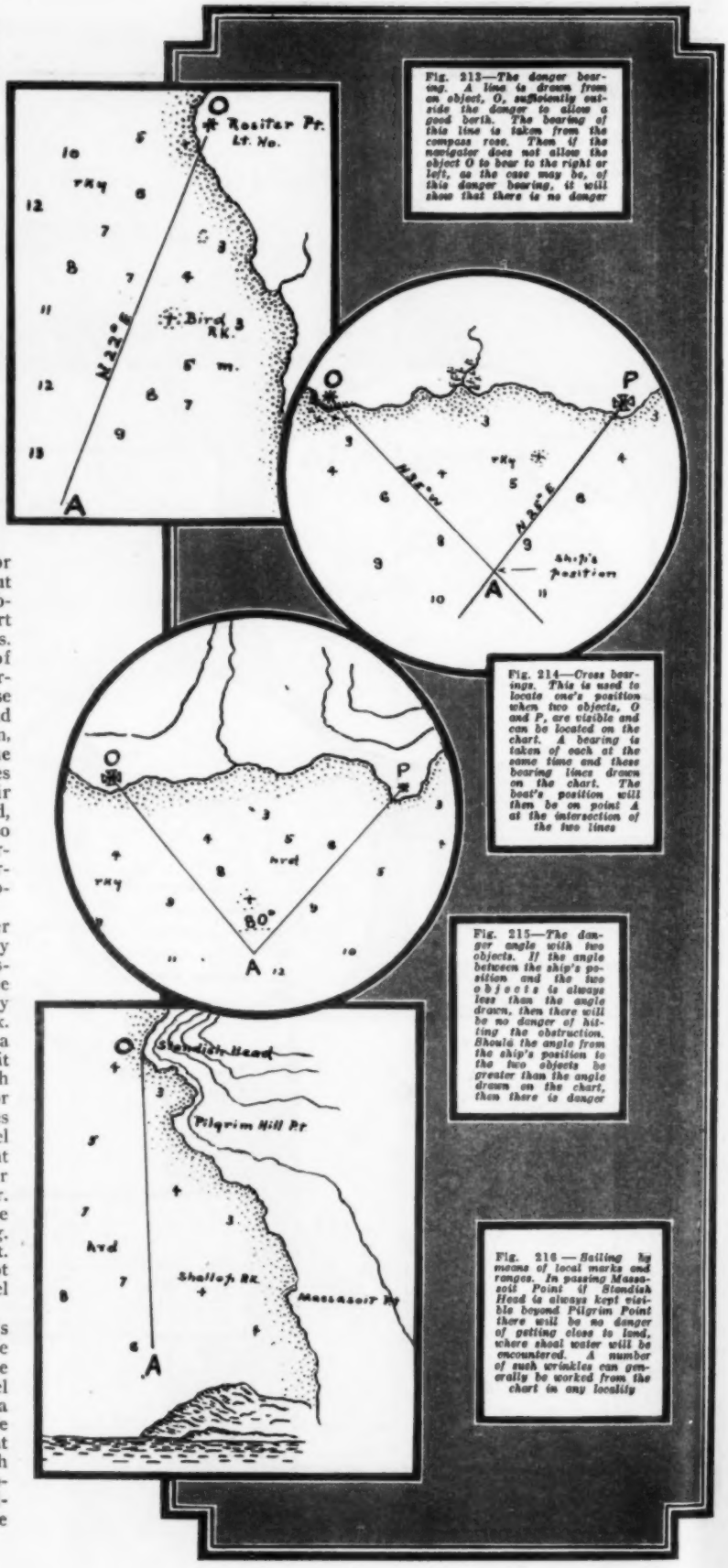


Fig. 213—*The danger bearing. A line is drawn from an object, O, sufficiently outside the danger to allow a good berth. The bearing of this line is taken from the compass rose. Then if the navigator does not allow the object O to bear to the right or left, as the case may be, of this danger bearing, it will show that there is no danger*

Fig. 214—*Cross bearings. This is used to locate one's position when two objects, O and P, are visible and can be located on the chart. A bearing is taken of each at the same time and these bearing lines drawn on the chart. The boat's position will then be on point A at the intersection of the two lines*

Fig. 215—*The danger angle with two objects. If the angle between the ship's position and the two objects is always less than the angle drawn, then there will be no danger of hitting the obstruction. Should the angle from the ship's position to the two objects be greater than the angle drawn on the chart, then there is danger*

Fig. 216—*Sailing by means of local marks and ranges. In passing Massasoit Point if Standish Head is always kept visible beyond Pilgrim Point there will be no danger of getting close to land, where shoal water will be encountered. A number of such wrinkles can generally be worked from the chart in any locality*

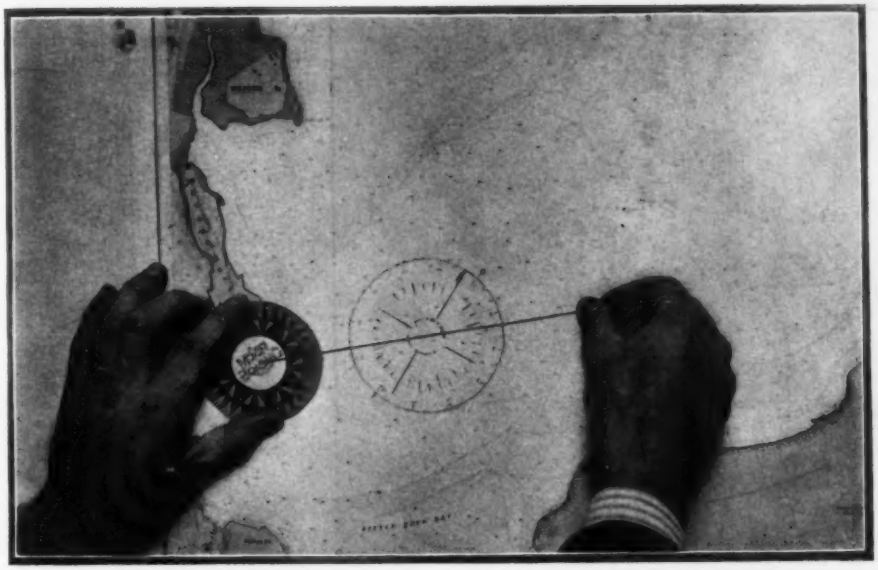
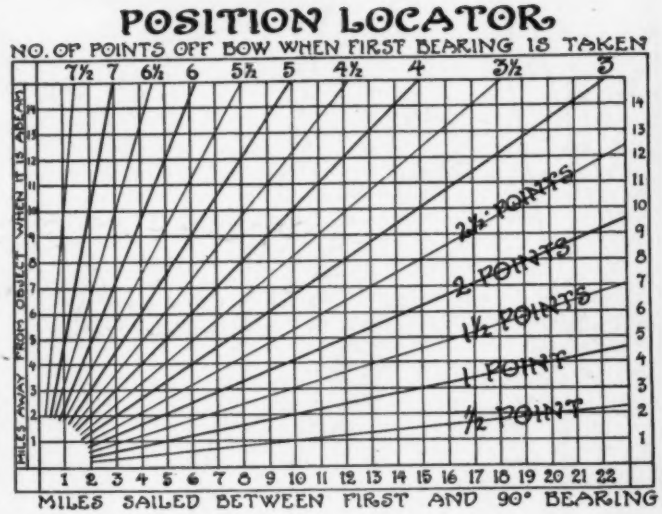


Fig. 217—*A convenient form of course protractor may be made out of a compass card and a piece of string. A hole is punched at the center of the compass card and the string drawn through it as shown in the diagram at the left. To use this course protractor it is simply necessary to place the compass card on the chart, its center coinciding with the boat's position. The string is then stretched so it cuts the center of the nearest compass rose on the chart. The point on the compass rose which the string cuts is noted and then the compass card is revolved so that the string will cut the same point on the compass card as it does on the compass rose. As shown at the left the string is cutting the point NE½E on the compass rose and the compass card of the protractor has been revolved so that the string cuts this same point, viz., NE½E.* (*See also Fig.* 219)

Fig. 218—*A convenient form of position locator, by means of which the position of one's boat can be accurately located when one object which can be located on the chart is visible. The method of using this diagram is to take a bearing of some object such as a lighthouse, an aid to navigation or some prominent landmark noting the time and log reading and the number of points off the bow which the object bears. The same course is held until the same object is abeam and then the time and log reading is again noted. If a log is used, then the difference between the two log readings will give the distance run between bearings. If no log is used, then by knowing the speed of the boat and the time between bearings, the distance run can be readily calculated. After the miles sailed between two bearings, that is, between the first bearing and the 90-degree bearing have been calculated simply use the figures at the bottom of the diagram and follow along the vertical line opposite this figure until it meets the diagonal line corresponding to the number of points off the bow which the object was at the time of taking the first bearing. Then follow along in a horizontal direction from this intersection to the left hand margin and the figures there will represent the number of miles away which the object is when it is abeam or at the time of taking the second bearing. For example, suppose we obtain a bearing of an object two points on our starboard beam at 9 P. M. Assuming our boat to have a speed of 8 knots we hold the same course until this object comes abeam, which occurs at 10:30 P. M. As our 8 knot boat has travelled one hour and a half between these two bearings it follows that the distance between bearings is 12 miles. Therefore, following along the vertical line in the diagram opposite the figure 12 at the bottom up to the diagonal line marked 2 points, then to the left horizontally from this intersection, we will come to the figure 5 at the left. Therefore, the object at the time of taking the second bearing at 10:30 P. M. will be five miles away from us. By laying off this distance in the proper compass direction on the chart the boats position will be at once determined*



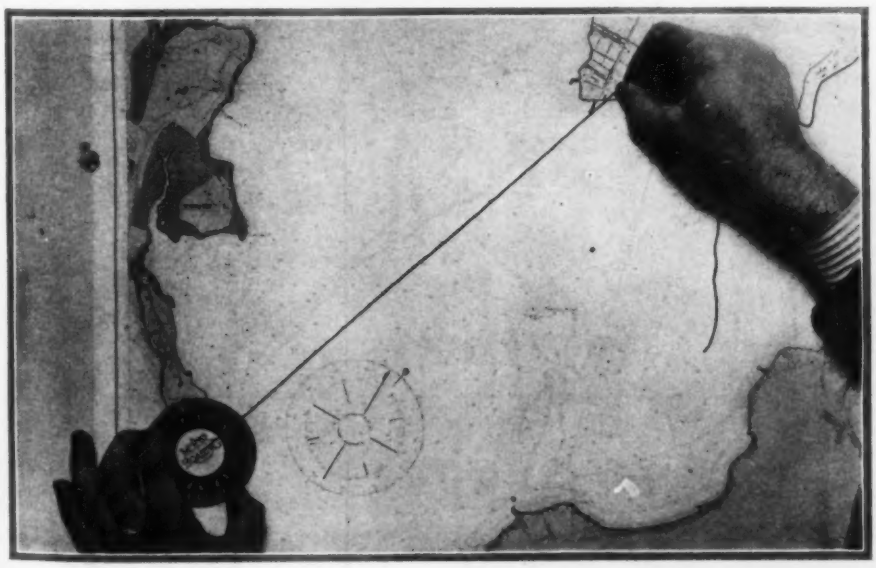


Fig. 219—*After the protractor has been set as indicated in Fig.* 217, *then to obtain the course which must be steered to reach any given point it is only necessary to carry the string shown in the right hand to the object which it is desired to reach, keeping the compass card firmly in position on the chart with the left hand. The string which extends from the center of the compass card to the point on the chart to which one desires to sail will cut a certain point on the compass card at the left. This will be the magnetic course which must be steered to make good this course. In the illustration at the left the center of the compass rose is at a point off Throggs Neck, at the entrance to Long Island Sound. The string extends to the wharf on Beldens Point, City Island. Therefore, the course to be steered between these two points is NNE ¼ N*

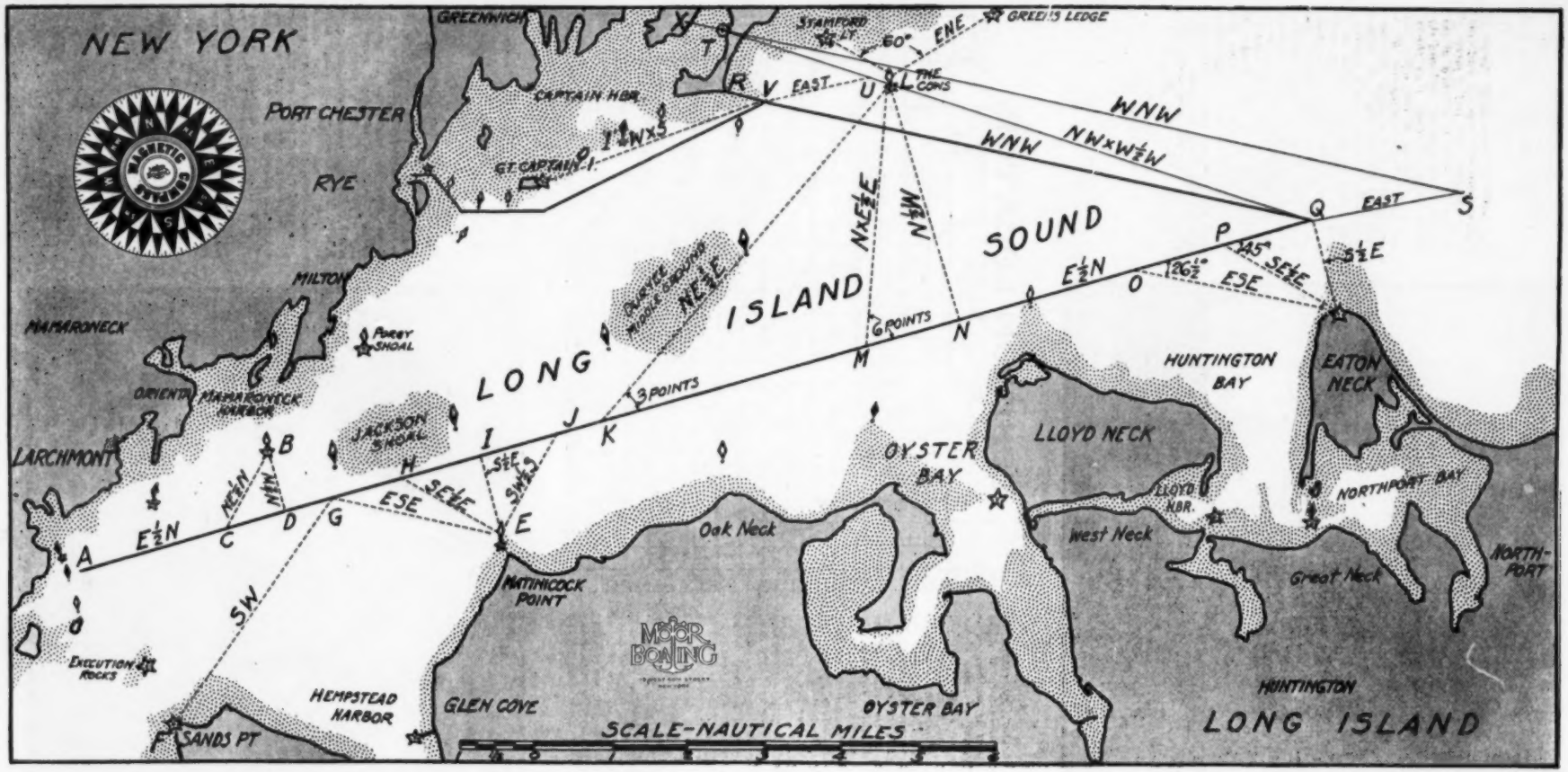


Fig. 220—Illustrating a problem in piloting. See text for full explanation

(*Continued from page 20*)

is not allowed to get any smaller. Thus both rocks are passed in safety.

Another way of protecting a vessel from a rock whose exact location is somewhat in doubt is by using a Danger Bearing (Fig. 213). These bearings are resorted to principally when cruising along a coast where the navigator is a stranger, otherwise the familiar aspect of the land would indicate his position. The diagram shows Bird Rock, an unbuoyed danger of the coast.

By drawing a line from the lighthouse sufficiently outside the rock to allow a good berth, a means is provided by which the danger may be passed in safety. The bearing of this line is taken from the compass rose (N 22° E), and in this case do not allow Rositer Point Lighthouse to bear northward of N 22° E. That is, if it should bear N 20° E it shows that the vessel has got on the danger side of the danger bearing.

It is a common practice for pilots to have marks by which they keep a vessel in deep water and away from danger. (See Fig. 216.) The sailing directions give a great many of these and they may appear something as follows: In passing Massasoit Point do not allow Standish Head to shut in by Pilgrim Hill, or perhaps,—Keep Standish Head open of Pilgrim Hill in order to clear Shallow Rock.

The pilot depends very materially upon the buoys, spindles and beacons maintained as aids to navigation, but this trust should not be too implicit, as buoys get adrift and sometimes drag or are dragged from their positions. But along such coasts as ours where the Government is alert to maintain an efficient system, buoys are quickly returned to their proper positions. Unfortunately this is not true everywhere. The same is true of the reliability of lighthouses. There are hundreds of them

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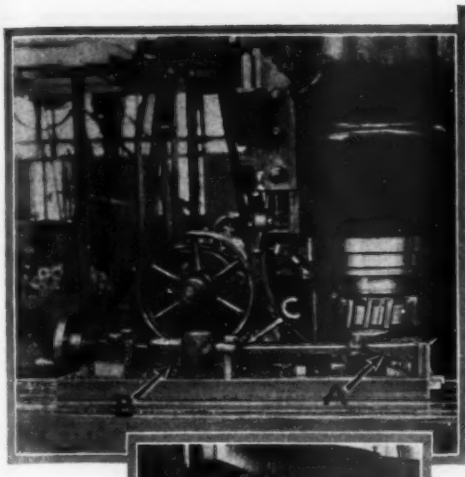
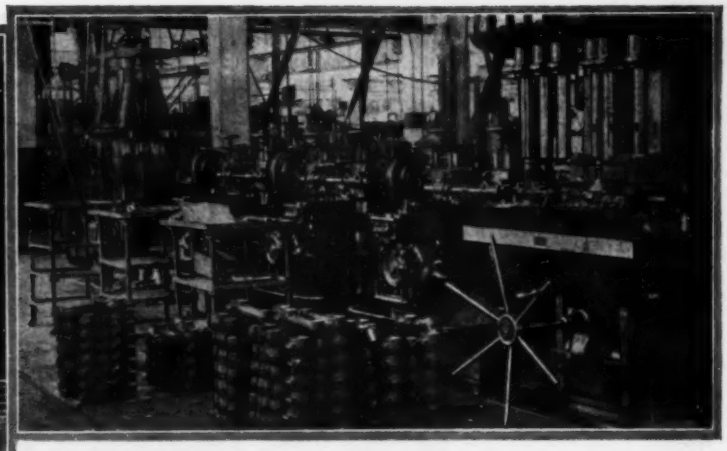
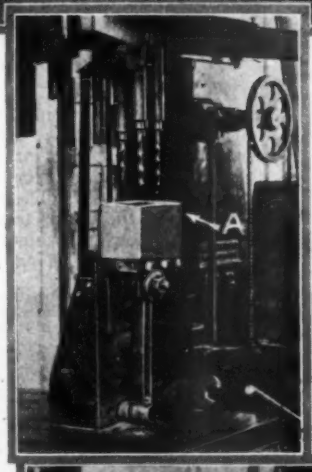




The three machines which handle the finishing of the connecting rods

Milling the big end of the connecting rod



The multiple fixture which drills the bolt holes in the big end of the rod

Building High Grade Motors

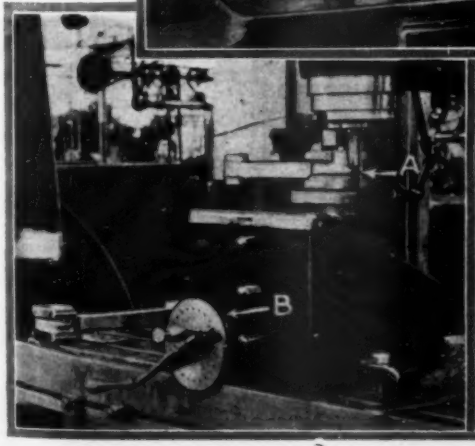
The Many Intricate Processes Which Enter Into the Completion of a Modern Marine Motor Require Accurate Machines and Skillful Mechanics

SITUATED away off on the west coast of the United States is the plant of the Hall-Scott Motor Car Co. at Berkeley, California. Even though this plant is far from the center of the automotive industries it is a noteworthy exception. Prior to the war its principal occupation was the building of railway motor cars from which the name is derived. E. J. Hall, the vice-president and general manager, was prominent in the development of the Liberty motor and is a gas engineer of the first order.

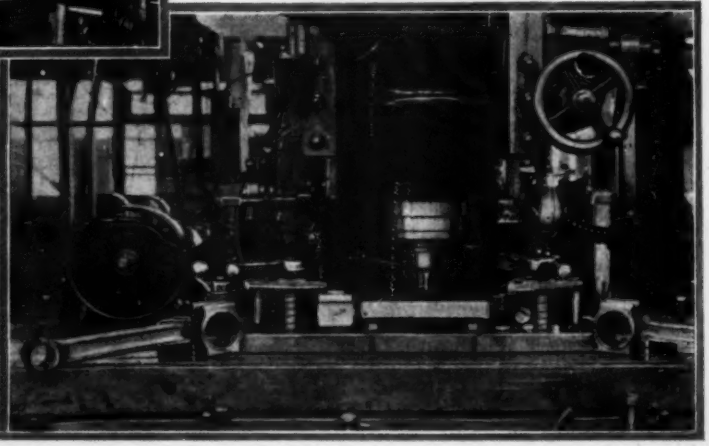
The methods in use in this plant in the building of Hall-Scott marine motors are among the most modern known to the industry. All jigs, fixtures, and tools used in the various operations are particularly designed for rapid quantity production and at the same time produce articles of the utmost accuracy. For example, the cast iron cylinders are all annealed in oil burning furnaces so that all internal stresses in the material are so distributed as to eliminate the possibility of cracking the castings in service or in further handling in the shops.

One of the first operations on the cylinders is that of boring the interior. This is done on automatic lathes and the fixtures are so adjusted that each

The grinder which finishes the small end of the connecting rod



Facing the surfaces of the connecting rods



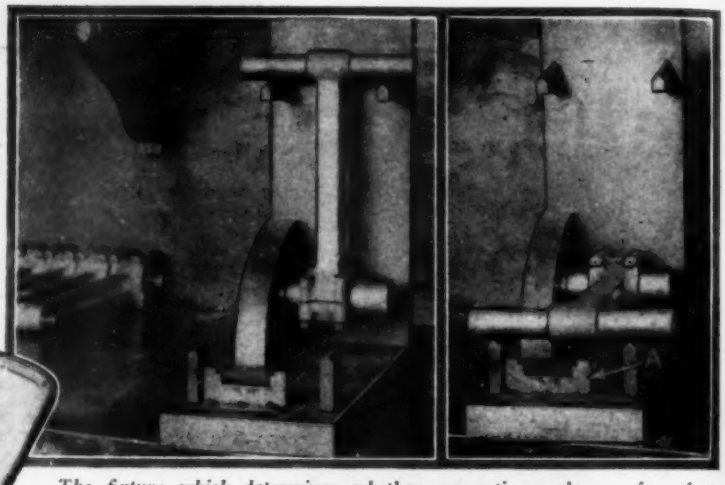
The end mill which finishes the channels in the rods

(Continued on page 79)

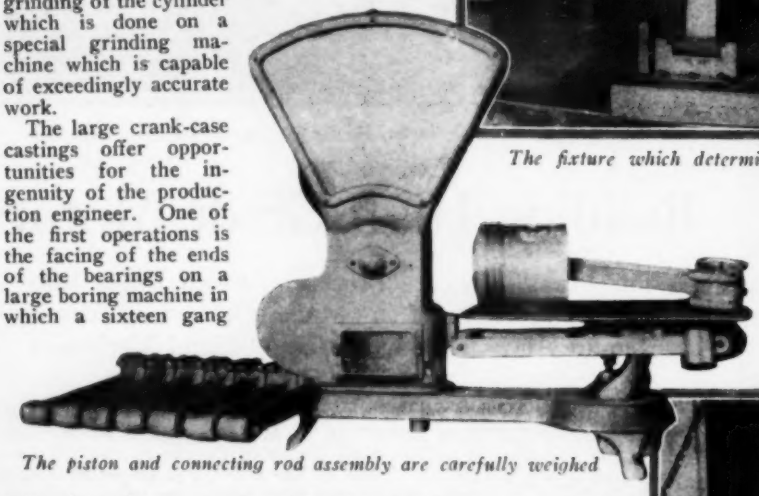
casting will be identical with every other one. A milling machine operates on the castings next and faces off the outsides of the castings. Twenty-one holes are then drilled in five different operations on one machine. There are six holes in the bolt flange and eleven holes in the exhaust side of the castings. The others are distributed around in various positions. The valve stem holes are drilled and valve stem guides fitted, after which the valve seats are bored. During all these operations the casting is always held in a fixed position by special fixtures so that the utmost accuracy will be secured. The finishing operation is the grinding of the cylinder which is done on a special grinding machine which is capable of exceedingly accurate work.

The large crank-case castings offer opportunities for the ingenuity of the production engineer. One of the first operations is the facing of the ends of the bearings on a large boring machine in which a sixteen gang cutter faces both ends of each bearing at the same time. This takes care of both the inside and the outside of the crank-case. Another operation is necessary to face off the pad to which the water circulation pump is attached. Further operations which require great care are the boring of the large holes in which these cylinder casting ends fit. Special fixtures hold the crank-case casting rigidly while these operations are being done. Numerous small holes are necessary, such as the cylinder holding down bolts, bearing bolts, etc. These are all drilled by drilling fixtures which operate on the crank-case so that the holes in both the upper and lower surfaces can be drilled by simply rotating the casting in trunnions on the fixture which is of the cradle type. Bearing holes for the crank-shaft are next bored and reamed, the crank-shaft being supported substantially while the reamer is maintained in correct relation to the face of the crank-case. The crank-case bearing caps are in place during this operation and correct alignment is secured. A simpler operation is the facing of the hand hole plate seat. This is done on a milling machine which faces off the entire surfaces in one operation. The openings for the starter and generator are bored on a universal machine and are located with reference to the main bearings so that the fixed relation between them is properly maintained. The surface at the after end of the motor to which the reverse gear housing is later attached is

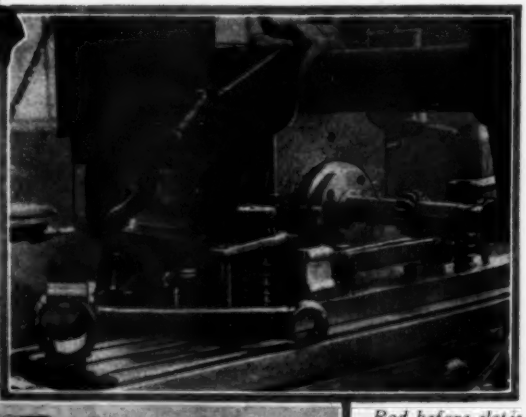
(*Continued on page* 60)



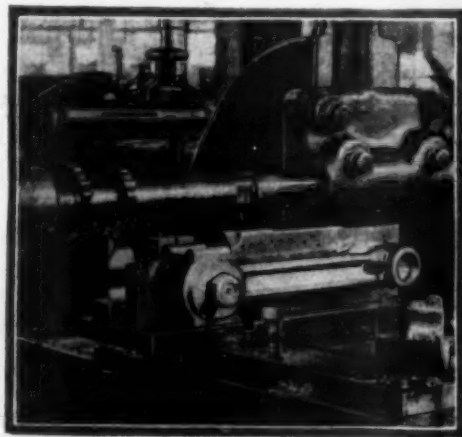
The fixture which determines whether connecting rods are free from distortion



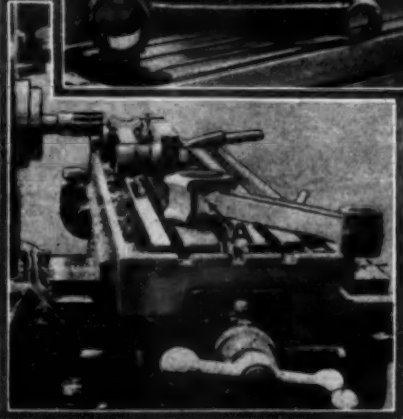
The piston and connecting rod assembly are carefully weighed



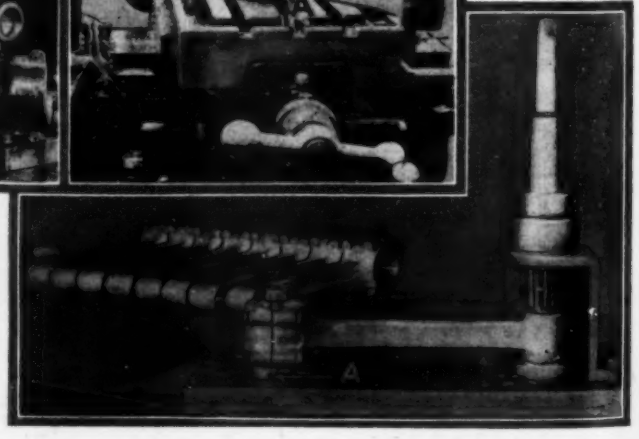
Rod before slot is milled and tool which does it



The milling cutter which trims both surfaces of the bolt boss

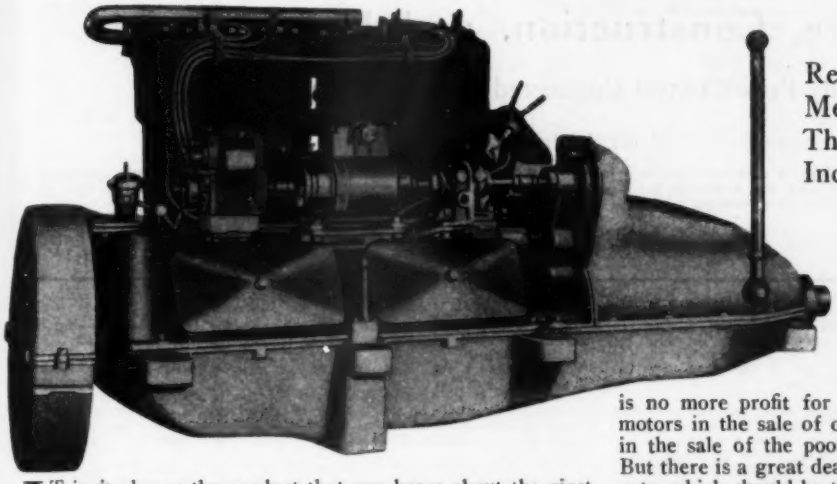


Finishing the outside of the rod



After the bushings are inserted they are reamed in this machine

Scripps Motors Show Up Well in Test



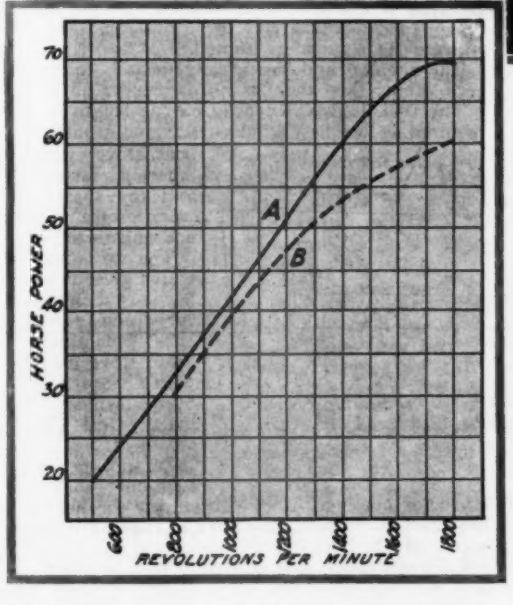
Remarkable Power Shown in a Medium Duty Motor of Only Three Hundred and Forty Cubic Inches Piston Displacement

The 4-cylinder 4¼ x 6-inch Scripps motor which showed 70 horsepower in an actual test

IT isn't always the product that one hears about the most that necessarily is the only good one built. It isn't always the manufacturer who makes the greatest noise about his line that has the best product or the best equipped shop to take care of his customers. This is particularly true of marine motors. There's no denying the fact that there are a number of good motors built today. There are also many that are not so good. The good marine motors are being improved and made better every year. The bad motors are not. Therefore, the difference between the good and bad motors is becoming greater every year. This is a very important matter, as the success of one's boat and the question of whether his boating is to be a success or a failure is entirely dependent upon his power plant. And don't forget one basic principle that can not be got away from. Good motors cost money, but they are worth it. Some makes can be purchased for much less money than the standard models, but the purchaser will only get what he is paying for. There is no more profit for the manufacturer who makes good motors in the sale of one of his good motors than there is in the sale of the poorly designed and constructed motor. But there is a great deal of difference in what the purchaser gets, which should be the answer.

Scripps motors have always been good motors. The Scripps motor of today is a much better motor than the Scripps motor ever has been. One may not hear as much about Scripps motors as about some, but they always performed creditably. No one will ever forget the wonderful performance of the motor boat Detroit which crossed the Atlantic a few years ago. She was the first motor boat to cross the Atlantic. She was powered with a Scripps motor.

A view of the test room at the Scripps plant



Power curve of a regular stock Scripps motor, 4 cylinders, 4¼-inch bore and 6-inch stroke

Scripps motors today are a strictly standardized product. They are built in three sizes only, all 4¼" bore by 6" stroke, two, four and six cylinders. They are built in one of the best equipped shops and by one of the best organizations in America.

We were out in Detroit a few days ago and dropped in at the Scripps plant unannounced. To the queries as to how their standard motors were working out and the amount of power they were developing we received as an answer from Henry Hellmuth, the congenial sales manager, "You know where the test room is; go find out for yourself."

Such a challenge could not go unanswered, so to the test room we went, and there found every type of modern apparatus for testing marine motors. One of each model motor was on the test block, so we decided that a test of the four-cylinder engine would be representative of all,

(*Continued on page* 94)

SMALL MOTOR BOATS

Their Care, Construction, and Equipment

A Monthly Prize Contest Conducted by Motor Boatmen

Questions Submitted for the January Prize Contest

1. Describe and illustrate the best method of raising a heavy mooring for re-location, when small boats only are available for use in the operation. Give special consideration to a mooring which may have sunk several feet into the mud.

(Suggested by H. A. M., Philadelphia, Pa.)

2. Describe a means of testing main and crankpin bearings for looseness, without taking the engine down, assuming that there are crankcase hand hole plates.

(Suggested by H. H. P., Oakland, Calif.)

Rules for the Prize Contest

ANSWERS to the above questions for the January issue, addressed to the Editor of MoToR BoatinG, 119 West 40th St., New York, must be (a) in our hands on or before November 25, (b) about 500 words long, (c) written on one side of the paper only (d) accompanied by the senders' names and addresses.

The name will be withheld and initials used.

QUESTIONS for the next contest must reach us on or before November 25. The Editor reserves the right to make such changes and suggestions in the accepted answers as he may deem necessary.

The prizes are: For each of the best answers to the questions below, any article or articles sold by an advertiser advertising in the current issue of MoToR BoatinG of which the advertised price does not exceed $25, or a credit of $25 on any article which sells for more than that amount. There are three prizes—one for each question—but a contestant need send in an answer to only one if he does not care to answer all.

For answers we print that do not win a prize we pay space rates.

For each of the questions selected for use in the following month's contest, any article or articles sold by an advertiser advertising in this issue of MoToR BoatinG of which the advertised price does not exceed $5, or a credit of $5 on any article which sells for more than that amount.

All details connected with the ordering of the prizes selected by the winners must be handled by us. The winners should be particular to specify from which advertisers they desire to have their prizes ordered.

Supplying Heat to the Cruiser

For Small Boat Heating, Stoves and Hot Water Systems Seem to Be Most Desired and Popular

Answers to the Following Question Published in the September Issue

"Describe and illustrate the most satisfactory way to heat a cabin cruiser, with both fore and aft cabins"

Heating the Cruiser

(The Prize Winning Answer)

IN planning the heating of a fore and aft cabin cruiser there are quite a number of things to be taken into consideration. How large are the cabins? Will the heat be required for long periods or only occasionally? What kind of fuel is available? Is there any possibility of gasoline gas, due to leaks in the tanks, piping or from the carbureter, getting in contact with the open flame of the heater? This is very dangerous and may cause a serious explosion.

The accompanying diagrams show several arrangements for heating a cruiser or house boat by means of stoves or with a hot water system similar to that used to heat a building. Hot water is the best means of distribution of heat because it retains heat a long time and is not likely to freeze over night should the fire die out. Steam is not good in this case because of the low head room, it would be hard to get a good circulation and keep the water in the boiler and the danger of freezing over night is very great as steam heat would not retain its heat the way hot water will.

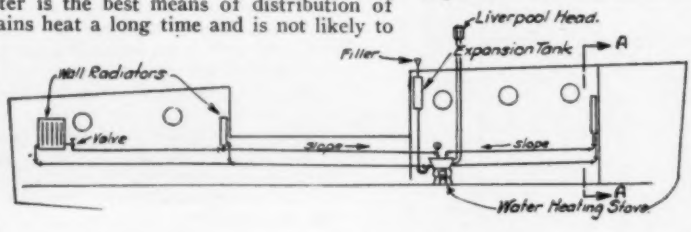
On a large boat, say a house boat, moored in a basin in winter, where fresh water and coal is available, and the boat is occupied at all times, it would be practical to install a regular gravity hot water heating system with sectional radiators, piping and a hot water boiler similar to a house heating plant.

On a smaller boat a regular kitchen range equipped with a water back, placed in the galley, may supply heat to two cabins by means of hot water radiators properly placed.

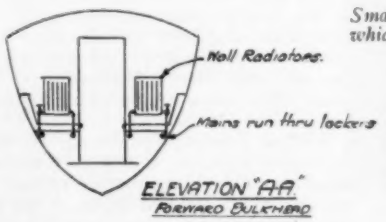
In both of the above systems there is danger of the water freezing if the fire is permitted to go out for too long a time. In case the fire is to be out for a day or more the entire system must be drained.

The simplest and best arrangement is to have a stove in each cabin; then there is no danger of anything freezing.

The fuel used will depend on the length of time heat is required. The best kind of a stove would be a regular boat stove, which would be securely fastened in place and the surrounding woodwork protected with asbestos and galvanized iron.



Small hot water heating system which has been used by W. E. M.



The stove may burn wood, which gives a lot of heat, but burns out quickly, coal or coke gives good heat and lasts some time. A regular grate stove may be equipped with a type of kerosene burner which is now on the market that gives considerable heat.

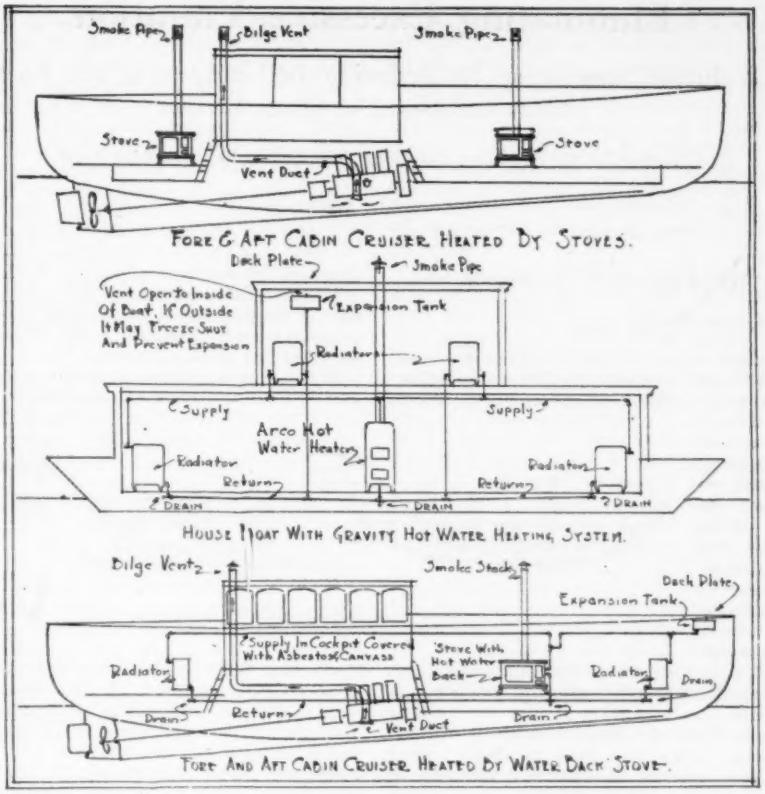
Do not get a gasoline or kerosene wick or pressure stove for heating. They concentrate the heat in one place, are fussy to operate, smell bad at times, are dangerous and, worst of all, burn up all the air in the cabin, and if it's ten degrees above zero outside, it will be about one hundred and ten degrees at the cabin ceiling and ten below at the cabin floor.

Have a type of stove with a chimney or stack to carry off the burnt gases; do not try to live in a gas house.

Wherever there is an open flame special precautions must be taken to prevent an accumulation of gasoline gas and to prevent this dangerous gas from coming in contact with the flame. This gas is heavier than air and will lay in the bilge of the boat unless some arrangement is made to remove it. Too much can not be mentioned about this point.

The removal of the gas may be accomplished by having a pipe duct about four inches in diameter run from the bilge to the outside air with a hood or liverpool head so that the wind will create a draft and suck out this gas. Have as few bends as possible in the duct and make them with elbows and do not have any traps or dips in it so as to make it as efficient as possible.

A. G. W., College Point, N. Y.



Suggestions by A. G. W. for heating boats of different types

Hot Water Heating Plant

FOR heating the double cabin boat, or, in fact, any boat of the closed type which is to be made comfortable in chilly weather, nothing can compare in simplicity and ease of operation to the hot water radiator system heated with a small coal stove. The particular system I have in mind was installed by an amateur and consisted of a small laundry water heating stove which stoves are wonderfully efficient in heating large quantities of water and have been developed to a state where they require but a few shovels full of coal a day and next to nothing in attention.

The stove in this particular installation stood but 24 inches high and was installed in the main cabin which was forward. It was installed in the galley and, beside heating the cabin, was also used to cook many a meal in its day, as these stoves generally have a flat top with two circular lids adapting them to cooking and heating water in a water kettle. The smoke flue was led up through the cabin roof and terminated in a Liverpool smoke head.

The stove itself, together with the smoke pipe, threw out considerable heat and consequently only two radiators were needed in the front cabin. These radiators were of the wall type and come 13 inches wide by 21 inches high and were mounted one on either side of the door in the forward bulkhead as shown in the drawing.

These wall radiators are about 3 inches thick and should be mounted about 2 inches from the bulkhead to allow generous circulation of air behind them.

In the after cabin four of the same type radiators were installed, two on the bulkhead and one on each side as far aft as possible, as shown in the drawing.

As to the installation details of a hot water system, the stove should be placed at as low a point as possible and the pipes should slope upwards toward the radiators, avoiding all traps which will hold air in the pipes. In other words, any air in the pipes should be able to find its way directly to the top of the radiators in both the supply and return mains. This slope should not be less than 2 inches in 20 feet. Avoid fittings as much as possible, as bends and fittings increase resistance to circulation, also the liability of leaks. Install a radiator valve in the supply line at each separate radiator as shown in sketch so that they may be modulated or shut off at will.

An expansion tank and filler pipe as shown in sketch must be provided, with the filler pipe running through the cabin roof, so that any overflow, due to overheating, will find its way overboard. This expansion tank should be connected with ½-inch pipe to the return line to stove, and this pipe should run below the return line before connecting to it as shown in the drawing. This is done to prevent hot water finding its way into the expansion tank.

A hot water heating thermometer is a very handy thing to have mounted on the stove, but is not strictly necessary. The altitude gauge usually found on hot water systems can also be dispensed with, and a gauge glass mounted on the expansion tank used to show the altitude or level of the water in the system, similar to that on a steam power boiler.

The radiators should be hot water radiators and not steam heating radiators, as the latter have inlet and outlets too small for the hot water system and are not arranged for circulation across the top of the radiator—a thing which is essential in the hot water system. Air valves should be installed in the top of each radiator to blow off the air which occasionally accumulates. These valves are threaded ⅛-inch pipe size and can be purchased of any plumbing and heating supply house. The water in the system should not be drained out in the summer, as rusting of pipes and leaking of fittings will surely follow. Keep your system full all the time and do not change the water unless absolutely necessary to do so. To prevent freezing, add one of the many anti-freeze compounds used in automobile radiators to the water in the system.

You will find this to be a fool-proof, easily maintained system of heating and one that will retain its heat long after the fire has cooled off—a feature not to be had with a steam system. It will also keep your cabin comfortable during the night without noise, smoke or fumes as compared with an oil stove.

W. E. M., Philadelphia, Pa.

A Cabin Heating Suggestion

THERE is no difficulty whatever in heating the cabins on a craft large enough to afford a night watchman. In this case any system of heating, hot water, steam, coal or kerosene stove, can be used with success and safety.

A small kerosene stove will do in a cabin of any cruiser in the day time, but it is quite a different problem when a

(*Continued on page* 50)

Eliminating Excessive Vibration

Valuable Suggestions for Reducing the Vibration of the Boat Due to the Motor or Other Causes

Answers to the Following Questions Published in the September Issue

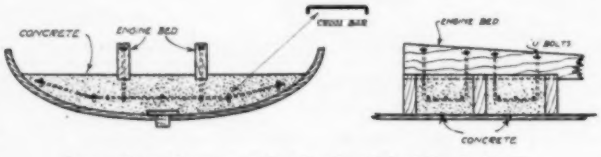
"Describe and illustrate any changes, repairs, or replacements you have made to decrease vibration in the motor or other parts of your boat"

Concrete to Absorb Vibration

(The Prize-Winning Answer)

DURING one season, a single-cylinder engine in a small boat caused such excessive vibration, that the following winter steps were taken to overcome it, if possible, as described below.

The engine was dismantled and all bearings taken up. The wrist pin happened to be worn and was replaced. One of the light weight pistons was fitted in place of the old heavy one to reduce the weight of the unbalanced parts. There are several makes of these light weight pistons on the market, both in cast iron and aluminum alloy.



A re-enforced concrete footing is advised by L. K. K.

The two-bladed propeller seemed to slip too much and it was noticed there was less vibration if the engine ran slower, so a three-blade wheel was fitted to keep the R.P.M. down. There is also a theory that as a two-blade wheel lines up with the stern post for an instant it operates in dead water, causing a vibration which the three-blade wheel is supposed to eliminate. Hence, we chose three blades in preference to a larger two-blade wheel.

The propeller shaft, it had been noticed, vibrated between the bearings which were too far apart for a small shaft, so a bearing was installed mid-way to prevent this vibration. The shaft was taken out and straightened where it was out of line between the old bearings.

I believe all the above helped to reduce the vibration, but the main factor, I think, was a concrete foundation placed under the engine. Between the cross timbers (about 12 inch centers), under the engine bed, was poured a mixture of 1 part cement, 2 parts sand, 3 parts iron punchings from a boiler shop. The illustration shows the method of placing the ⅜-inch iron reinforcing rods and the U bolts which bolted the engine timbers to the concrete. The tops of the U bolts were below the surface of the engine timbers to let the engine base lay flat. The engine was fastened with lag bolts to the timbers.

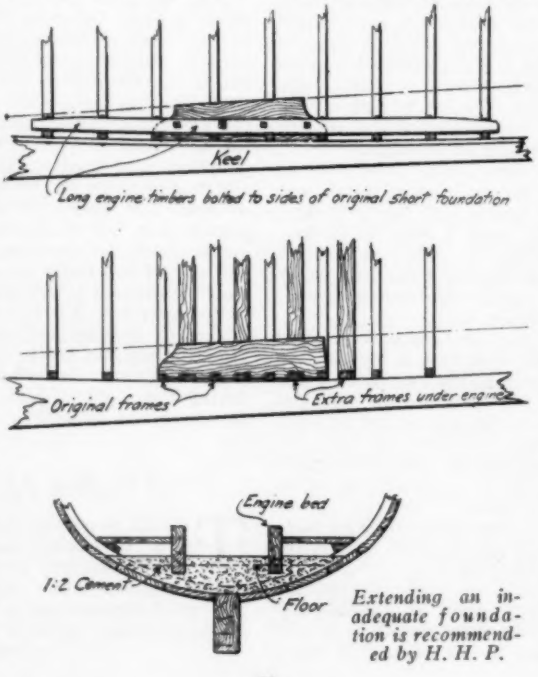
Before the concrete was poured, the space was cleaned out and given two coats of creosote. Concrete itself weighs something over 100 pounds per cubic foot, but with iron punchings this weight is considerably increased.

Altogether, 300 to 350 pounds of concrete was used. We had no objection to this extra weight, but I realize in some cases it may be objectionable. Our purpose was to eliminate the vibration, and we did anything that seemed reasonable, all as described above, and succeeded in getting a remarkable difference from its previous performance with its excessive vibration.

We also installed a good silencer, as the exhaust was one of the audible forms of vibration (if such a term is permissible) and, eliminating the noise, reduced the feeling of vibration in this respect.

It is surprising how much the steady bark of the motor can do toward causing that unconscious feeling of vibration.

L. R. K., Philadelphia, Pa.



Extending an inadequate foundation is recommended by H. H. P.

Reducing Vibration from Engine in Hull

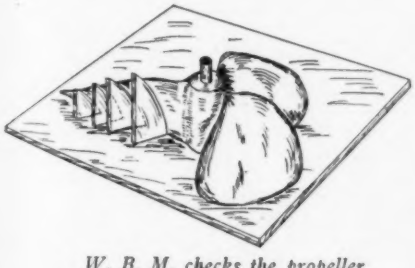
VIBRATION of engine and hull may be due to unbalanced reciprocating parts of the engine itself, in a light or insufficiently trussed foundation or hull or to all three causes. The first can only be overcome, assuming that the engine is in good running order and the mixture correct and no back pressure in exhaust line, by constructional changes or the addition of crankshaft counterbalances, etc. If the trouble is in the construction of the engine foundation, there are several methods by which the vibration may be greatly reduced or eliminated. Often the engine timbers are too short, though the form of the crank case may prohibit the use of anything longer. If possible to remove the old foundation and install a pair of longitudinals running as far as possible fore and aft and riveted or bolted to the frames, the vibration will be taken up along a good portion of the hull instead of being concentrated along only the former short timbers and such a construction will usually result in the practical elimination of the trouble. If the engine and foundation cannot be removed, it might be possible to run the longitudinals outside of the original timbers and bolt or rivet the two sets together, thus giving about the same result. Such longitudinals, to save weight and space, may be tapered off at their ends before installing.

In cases where long timbers cannot be installed, due to the construction of lower crankcase or hull, extra heavy floor timbers and frames installed under the engine space will help to reduce vibration. The foundation timbers and ceiling must be removed before setting these in place. Sheet metal or cardboard patterns may be cut out and fitted to the hull to get the shape of the floor timbers and these may be fitted with little trouble; they should be well drift bolted or otherwise fastened to the keel and securely screwed or nailed through from the planking. Fitting the extra frames to a round bottom hull after the planking is already in place will prove a rather troublesome job; the best way is to build a rough mould to set into the hull at the point

where a set of frames is to be installed and then nail a series of slats, pointed at the outer ends, around the edges of the mould (which do not have to reach the inside of the planking) so that the points just touch the planks. Then remove the mould, in halves if necessary, and use it in making up a bending form for a pair of frames, giving the form more of a bend than required to allow for a slight straightening of the frames which always occurs when they are cold and removed from the mould. A frame bent more than necessary can be easily straightened, but no more bend can be put into one without re-steaming. If possible, the extra frames should be wider than the original ones, as shown in the sketch, but, as a rule, they cannot be made thicker without interfering with the ceiling, and besides are harder to fit. If impossible to make a frame of this kind fit the planking closely all along, it would be allowable to trim off the outer edge to some extent, for the planking must be closely fastened to the frame all along to produce good results.

Still another way, if the first two are impracticable for any reason, is to thoroughly clean out the bilge under the engine foundation and pour in cement up to the tops of the floors, or higher if weight does not matter and the engine crankcase will allow it. A mixture of one part cement and two of sand is about right. Gravel may be added but no rock should be used. When hard, the cement will tie together the frames, floors, engine timbers and planking and will damp considerable of the vibration.

The writer has used all three of these methods with success; in regard to the last, it is realized that there exists a great difference of opinion as to the use of cement in a wood hull. Nine years ago, about five hundred pounds of cement ballast was poured into the hull of a twenty-eight-foot cruiser which had then been in the water about four months; this ballast was



W. B. M. checks the propeller and extends the base

run about three-quarters of the length of the hull, fore and aft, and up even with the tops of the floor timbers. The present owner of the boat states that the cement is still in position and that he has carefully examined the planking without detecting any signs of decay.

H. H. P., Oakland, Calif.

Vibration—Its Cause and Remedy

VIBRATION is present wherever machinery is in operation. It cannot be entirely eliminated, no matter how carefully the moving parts are balanced, but it can by careful attention to balance, foundation, alignment, etc., be reduced to a minimum. In reciprocating engines vibration is most noticeable, due to the impossibility of exactly balancing the weight of its moving parts and the application of power, while well balanced rotary machines run with so little vibration that it is hardly perceptible.

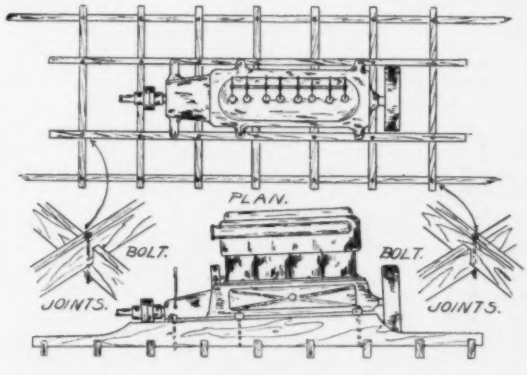
A motor installed in a boat, which, to a certain extent, is flexible and more susceptible to vibration, operates under different conditions than when installed on an ample shore foundation.

The motor is not the only cause of vibration in a boat, but it is its chief source and all secondary vibrations are the result of its turning. A single-cylinder motor is in this respect the worst, and any attempt at balancing by the addition of counterweights, introduces new unbalanced forces, which even if of lesser intensity are still of appreciable magnitude. Two-cylinder engines can be better balanced, but by increasing the number of cylinders it is still impossible to secure an absolute balance of forces. As an absolute balance is impossible, vibration can not be entirely eliminated, but it can be so distributed that it becomes negligible. This is best accomplished in a marine installation, by a long motor foundation (engine bed) rigidly fastened to the keel and to sister keelsons having the widest possible spread. These sister keelsons are fastened to the frames only and not to the planking. In light construction it is advisable to extend the engine bed the full length of the hull, and use cross-beams as close as practical.

The propeller is next in importance as a producer of vibration. Unbalanced weights, unequal pitch of the blades, thick edges, and the throwing of water against the hull with a pounding effect are all causes traceable directly to the propeller.

The balance of the mass of the propeller is easily tested by fitting it to a short length of shaft and rolling on knife edges. When unbalance is found, file off the back of the blade (corner side) until it will come to rest in any position. A little care is all that is necessary to secure a well balanced propeller in respect to weight, but this does not imply that the propeller is balanced in all respects.

Testing the pitch is not so simple an operation. First scribe a circle approximately three-quarters the diameter of the wheel. Lay the propeller driving face down so that its center and the center of the circle coincide. You can now test the pitch of each blade, by using a bevel or making a templet to the angle of the blade. Adjust the bevel or templet so that its base touches the circle at each end, and the blade or slant side of the templet to touch the leading and following edges. By placing the templet under the other blades in exactly the same position, any inequality of pitch will be evident.



The pitch may be restored by beating the blade back to its original position with a rawhide or wooden mallet on a block of hard wood. In this way the metal will not be strained or hardened in spots, as would be the case if a hammer and anvil were used. Before attempting to alter the blades make a templet to work to by setting up the propeller on a perpendicular shaft having a collar so that the wheel can revolve freely. Make several templets, at least three, to fit a blade, the leading edge of which is straight and all curves are true. In this condition the blade is very likely true to pitch as manufactured. Fasten these templets permanently in a perpendicular position to fit the blade. Raise and turn the propeller to try the other blades. When each blade checks with the templets, the pitch of all blades will be the same.

When all blades are out, the original angle may be found by laying out a line equal to the circumference (D x 3.1416) and erecting a perpendicular equal to the pitch and completing the triangle. The angle of the hypothenuse and base of the right angle triangle is the proper blade angle for the given pitch.

Thick blade edges are not troublesome except at high propeller speeds, when cavitation is the result. However, it is advisable to reduce the thick edges by filing from the back of blade only.

A two-blade propeller working behind a deadwood may cause vibration due to the water directly aft, the deadwood being less dense than the surrounding water which allows the wheel to speed up when both blades are in this position, unbalancing the torque. In a three-blade propeller this condition is impossible.

In an installation where there is very little clearance between the tips of the blades and the hull, a water pound

(*Continued on page* 50)

The Way We Would Do It

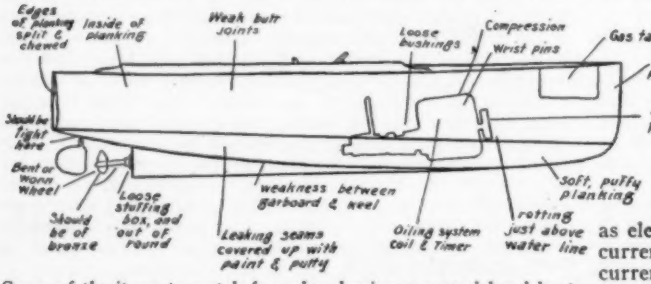
Conducted by F. W. Horenburger and A. E. Snyder

EVERY month MoToR BoatinG's staff of experts answers thousands of inquiries about boats, engines, accessories and, in fact, everything marine. There is hardly a branch of the sport or industry on which they are not constantly being asked to give their opinions. They are very glad to do this, as well as to be of whatever service they can to MoToR BoatinG's subscribers and readers.

Quite naturally, many requests for information are received on subjects which are not of universal interest to every motor boatman. This, as well as the fact that it would be a physical impossibility to print answers to all questions received, makes it necessary for us to follow the rule of only printing answers to the few most important and interesting questions. However, we always give a reply by mail, so if you are perplexed about any questions pertaining to boating don't hesitate to write "The Way We Would Do It" Editor.

I KNOW you have published before pointers on where to look for weak spots in buying a second hand boat but not being interested at the time did not save those back numbers of MoToR BoatinG. *Will you kindly enlighten me through your magazine? P.I.C., New Haven, Conn.*

The sketch herewith points out most of the weak spots



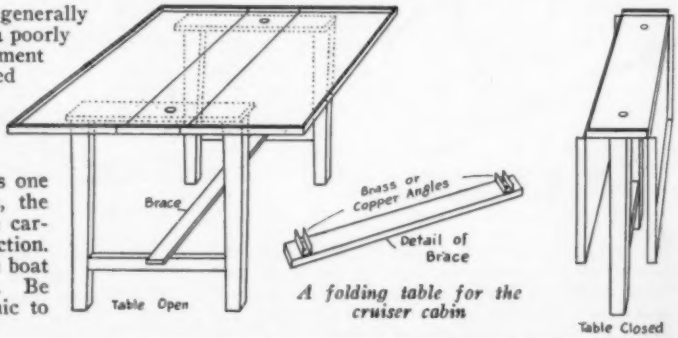
Some of the items to watch for when buying a second-hand boat

in a boat which is no longer new. These faults generally take the form of leaks caused by the pounding of a poorly installed engine which may not be in proper alignment with the hull. A prospective purchaser of a used boat should carefully examine all the places shown in order to be certain that it is in good condition. The engine should be examined to see if the bearings are sound and true. The pump should be in good order. A cool engine is one which has the longest life. The oiling system, the ignition and timer all should be examined. The carburetor and gasoline piping will also stand inspection. A demonstration of the actual performance of the boat at sea will convince the purchaser of its ability. Be certain that it will not require a skilled mechanic to keep the boat in running order. See that the engine starts readily and runs without requiring continual nursing.

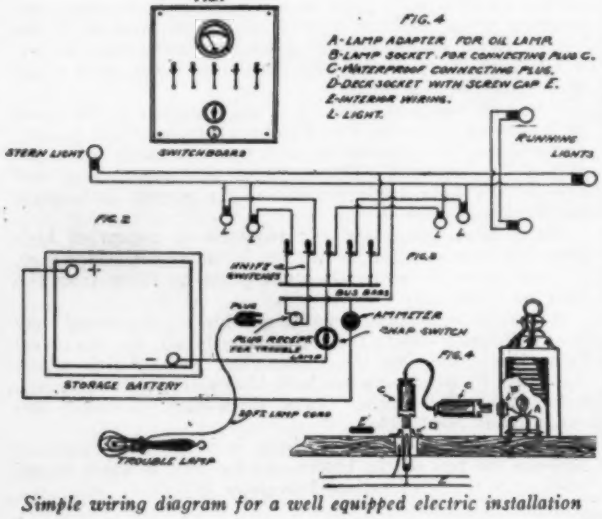
* * *

I am planning to instal a small storage battery for electric lighting purposes on my 28-foot cruising boat. I would like to have the benefit of your advice in order to build a switch board and information as to the proper method of wiring the various fixtures. I do not propose to carry a generator but will have the battery recharged on shore when necessary. W.H.E., Port Jefferson, L. I.

The advantages of electric light on a small boat are many. The storage battery provides ample current for ordinary lighting service, provided the battery is not loaded too heavily with other auxiliary devices. Such articles as electric horns, and searchlights use up large amounts of current and unless the battery is kept fully charged these current consuming devices are not recommended. Our sketch shows in diagrammatic form the method of wiring up



A folding table for the cruiser cabin



Simple wiring diagram for a well equipped electric installation

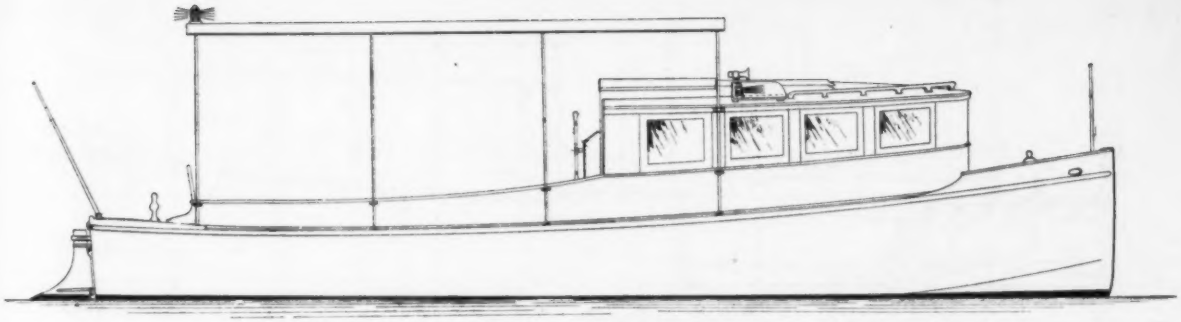
the small switch board which has a main shut off switch, an ammeter, a plug receptacle for the trouble light and individual switches for the several circuits. The connection for the removable socket for the running lights is also shown. Fig. 1 shows the general appearance of the front of the switch board. Fig. 2 shows the storage battery. Fig. 3 is the wiring diagram, and Fig. 4 is the lamp connection and explanation of various parts.

* * *

We would like to build a folding table for use in the cabin of our cruiser. Several ways of doing this have been suggested to us but we are writing to you for your opinion and suggestions. We have ample room in the cabin to support a table about four feet long and thirty-six inches wide when opened. C.R.T., Pawtucket, R. I.

A very simple form of table can be readily built of mahogany ¾ inches thick in the form shown in our sketch. The legs are fastened to the top center board of the table in such a way that when in the folded position they do not extend beyond the edge of the table. In the open position they serve to support the two folding leaves in the same plane as the center piece. The legs can be tapered slightly and should be about 26 inches long with a cross brace eight

(*Continued on page* 94)



Outboard profile of Alligator, the 28-foot tunnel stern cruiser

Alligator, A 28-Foot Tunnel Stern Cruiser

Complete Working Drawings and All Necessary Information to Enable the Amateur Builder to Construct His Own Boat

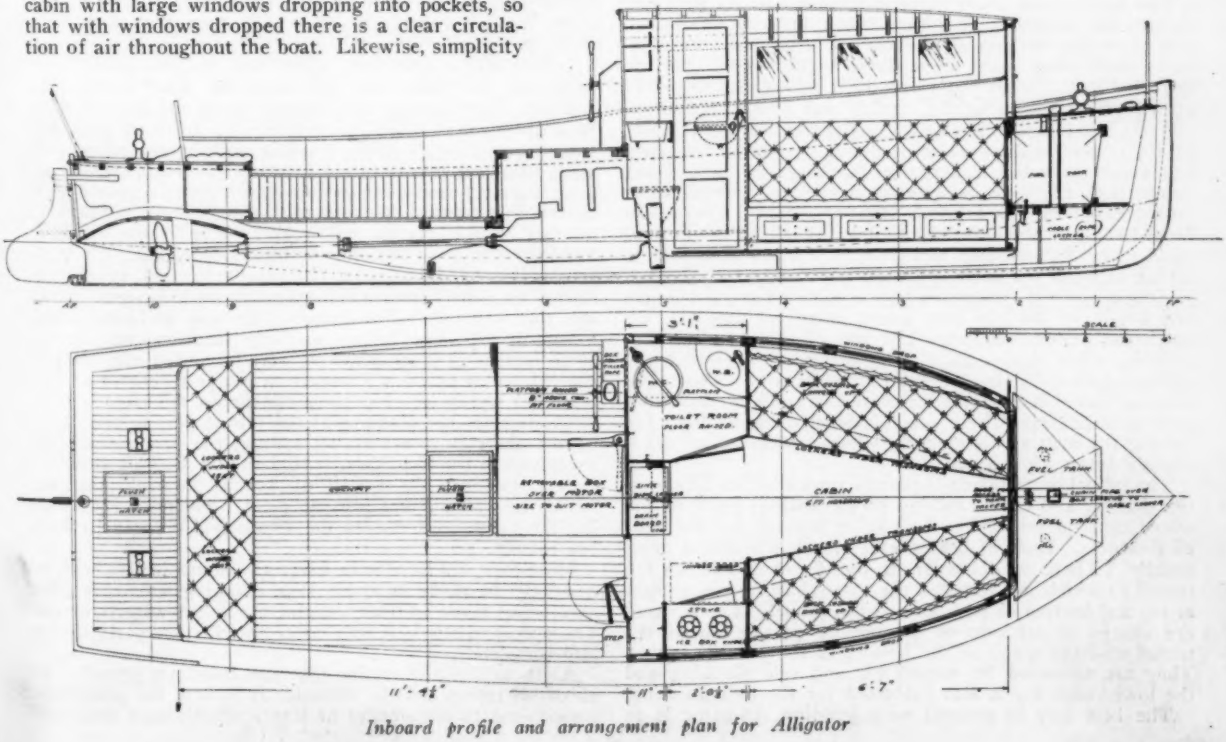
By Wm. J. Deed

Designed Exclusively for MoToR BoatinG

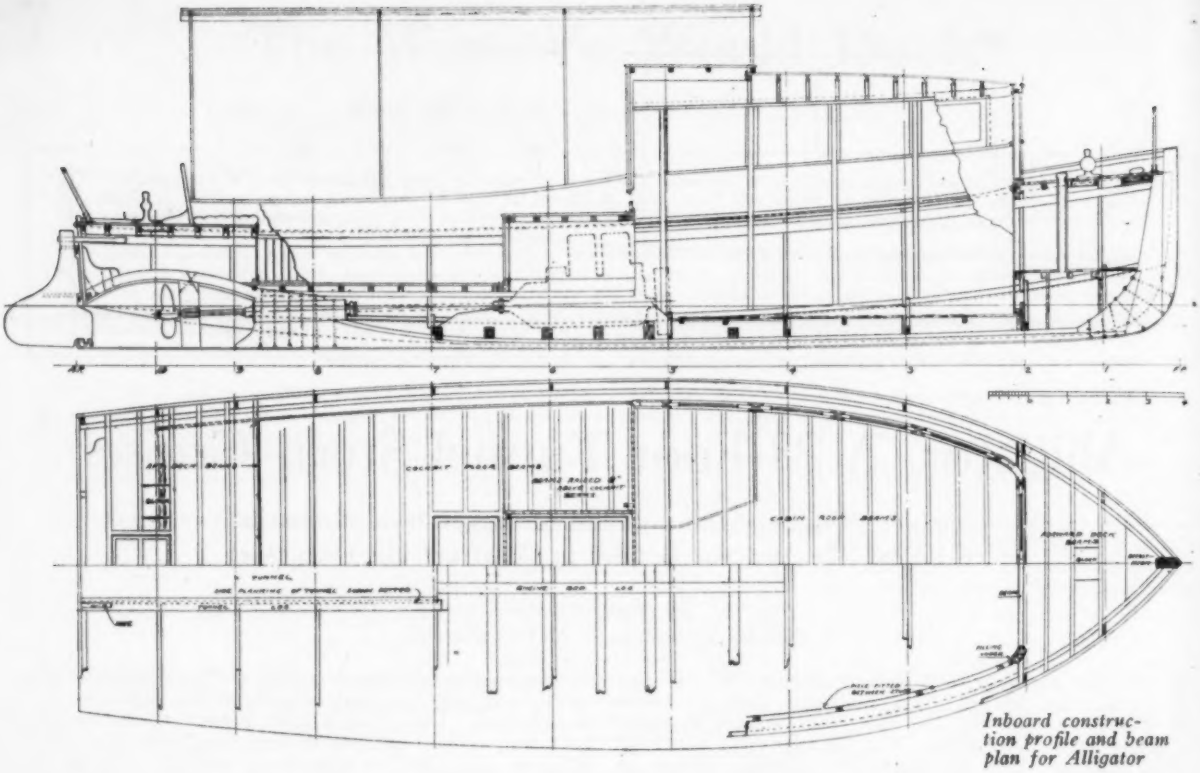
LIKE her namesake, Alligator is designed to navigate where the bottom is near the top. Only 13 inches draft has she, but she swings an 18-inch diameter propeller in a tunnel stern. For the sportsman North or South, East or West, who goes duck shooting, fishing, or camping in shoal waters, she is admirably suited. Four people can be accommodated in her cabin on berths, and there are a separate toilet room and a galley in the aft end of the cabin. Over the cockpit is an awning which has 7 feet headroom under it in order to provide plenty of air as well as room for handling fish poles and lines with some degree of ease.

No attempt has been made to make a handsome yacht out of Alligator, but she is not a bad-looking boat at that; the idea was to get a roomy cockpit with a big roomy cabin with large windows dropping into pockets, so that with windows dropped there is a clear circulation of air throughout the boat. Likewise, simplicity of construction was aimed at with a view to amateur construction in the back yard, securing at the same time good construction. There is deck space at each end for handling lines, and as most cruisers in very shoal water find themselves at some time or other on a sand bar or mud flat, there are on the aft deck two husky bitts to which ropes can be safely secured for kedging off by carrying a heavy anchor out into the stream astern.

Under the forward deck are two fuel tanks, each with fill, with feed piping led from inner sides of tanks down along under the flooring close to a removable floor board, the tank valves being also accessible between the tanks by a door between the transoms in the bulkhead at the forward end of the cabin. That bulkhead is screw fastened in place



Inboard profile and arrangement plan for Alligator



Inboard construction profile and beam plan for Alligator

so that it can be readily removed in case it is necessary to remove tanks. Under the cockpit floor is a water tank. In the cabin there is 6 feet headroom, the cabin floor being laid on the floor timbers, the floor line (where the cabin floor meets the inside edge of the frames) being back under the transoms so that all the floor area is flat and usable. Between the fuel tanks the anchor rope is led down through a boxing to the rope locker when it is desired to coil on deck.

The two-burner yacht stove is mounted on an insulated dresser top, under which is the ice box and aft of the stove is a space for hanging up clothes, not large, but remember, folks don't wear many these days. Additional hooks are provided in the toilet room and other hooks can be placed at will about the cabin for clothes one does not want to convert into old rags by stowing under the transoms. Away up high over the flywheel, with plenty of room under same, is the sink with dish lockers over it, the galley pump being mounted on the toilet bulkhead and piping led from water tank. Sink drain is into the lavatory drain. There is a hinged shelf on the bulkhead in front of the stove to afford table space for cooking, and there is a removable folding dining table in the cabin.

Ample space is shown for any suitable motor, the length and height of the box over motor being regulated by the particular motor installed. The top of this box removes and the sides remove as a unit, being screw-fastened to rabbetted sill. Ample access to the motor is provided. The steering wheel is mounted on the cabin bulkhead and tiller rope is boxed in. There is a platform 8 inches high for raising the man at the steering wheel where he can get a slightly better view ahead.

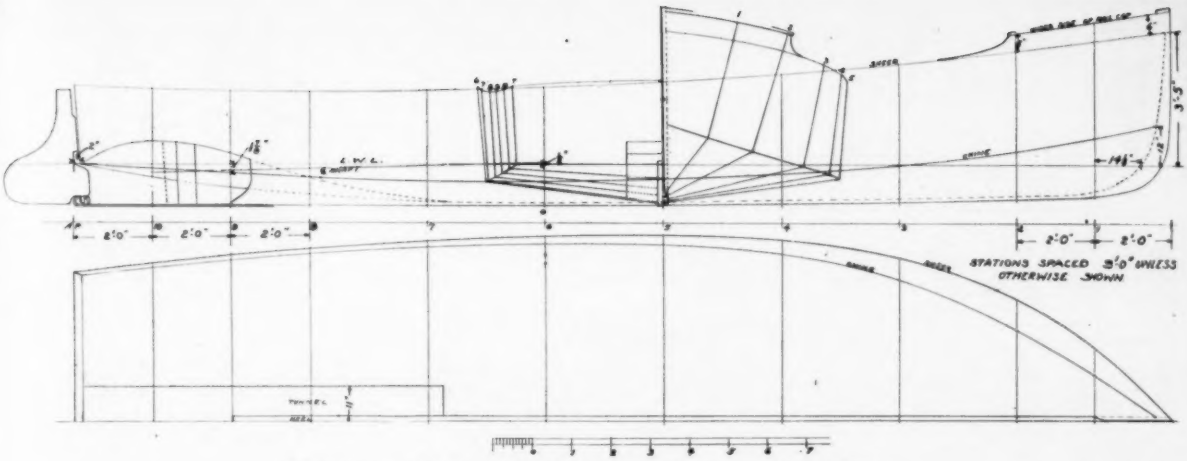
The tunnel construction is plainly shown in the drawings, the shading and cross-hatching of the various parts of the whole construction of the boat being left off for the sake of clearness. Ends of beams, etc., are shown with a cross usually. There is a header at the forward end of the tunnel to which are fastened the two rabbetted tunnel logs at top and bottom of each side of the tunnel. These pieces are shaped to conform to the outline of the top of the tunnel and the shape of the bottom at the side of tunnel. They are rabbetted for tunnel top and side planking and the lower edge log is also rabbetted for the hull planking.

The best way to proceed with building Alligator is to reproduce full size on a smooth floor on which building or other heavy paper has been stretched each outline of mould at each station shown on the mould plan, then drawing in the planking, chine log, keel and frames in correct size. Don't bother with seam battens now. You now have patterns to lay on your stock for frames, as the frames occupy the same position that moulds do in usual construction. You can lay paper patterns on stock and get out frames, cutting no notches, however, but fastening upper and lower frame pieces together and notching for keel, apron, and chine log. Put diagonal braces on these frames to keep them in shape until wanted.

Lay down the base line, water line, stations, tunnel outlines, etc., and draw the keel, shaft log, stem, apron, etc., full size. Lay these patterns on the stock and get out stem, stem apron, keel, shaft log, tunnel logs, transom knee and knees connecting transom framing with upper tunnel log. Bore shaft log before fitting in place. Set up backbone of boat, mount frames in position, bracing same square with center line and plumb, run chine logs into position in notches in the frames and make whole frame rigid by bracing to floor of building or beams overhead. Fit transom in place. Bend seam battens in position roughly as shown on plans to suit widths of planking to be used, mark, and then cut notches in frames. Be sure to have battens sweep in fair line before marking locations on frames. With battens in place, planking may be gotten out, measuring the width on each frame from center to center of battens and laying off this measurement on the stock. First in getting out the planking is the job of getting the sweep of the sheer or the chin by spiling, the procedure being explained in the February, 1921, issue of MoToR BoatinG. After planking, the fitting of beams, flooring, decking, house, etc., should not present great problems. By studying the house construction the details will be seen to work out readily.

Most care will have to be given the tunnel in this boat, no haste can be made in fitting logs, planking, etc., there, but care being taken to make careful fits and a watertight job. The specifications herewith cover the various parts of the hull completely.

As to motor, any engine that can handle a propeller of 16 or 18 inches will be suitable; it is best for propulsion reasons not to use smaller or larger wheels than these and



Complete set of lines for the 28-foot tunnel stern cruiser Alligator

they should be three-bladed wheels. The speed depends upon the horsepower and revolutions, of course, but generally speaking, as an average installation a 10- to 20-horsepower engine will drive Alligator as fast as she ought economically to go, i.e., about 7 to 9 miles an hour respectively with these engines. She will never make a speed boat, just a slow, comfortable boat.

Arrangements have been made whereby those desiring full scale blue-prints of the drawings for any of the designs in this series can secure them at nominal cost by addressing F. W. Horenburger, 63 West 184th Street, New York, N. Y.

If you need such a boat, here are the specifications for building her:

Specifications

In General: In carrying out these specifications only the best lumber shall be employed. All lumber shall be air-dried, free and clear of all loose knots, checks, dry rot, sap, etc., that would render it unfit for use, and all fastenings, unless otherwise specified, to be hot-dipped galvanized stock. Boat to be built under cover.

Dimensions of the completed boat to be: Length over all, 28 ft. 0 in.; breadth over planking, 9 ft. 6 in.; draft, 1 ft. 1 in.

Hull

Keel: White oak or yellow pine sided 3 inches, molded as per plan.

Keel Batten: White oak or yellow pine sided 5 inches, molded 1⅛ inches secured on top of keel by floor timber fastenings and nailed to keel between floor timbers by nails with heads countersunk and covered with pitch or bituminous cement to prevent bilge water reaching them.

Stem: White oak or yellow pine sided 3 inches, molded as per plan, reinforced by 3-inch oak or yellow pine apron bolted through stem every 9 inches above knee bolts by ⅜-inch diameter galvanized rivets, heads countersunk in face of stem and plugged. Apron to be reinforced by 3-inch oak knee secured to keel and apron as indicated by ⅜-inch galvanized bolts as above. Stem band to be ½-inch brass half-round secured with brass screws, stem band to extend down to meet brass rubbing piece on keel bottom.

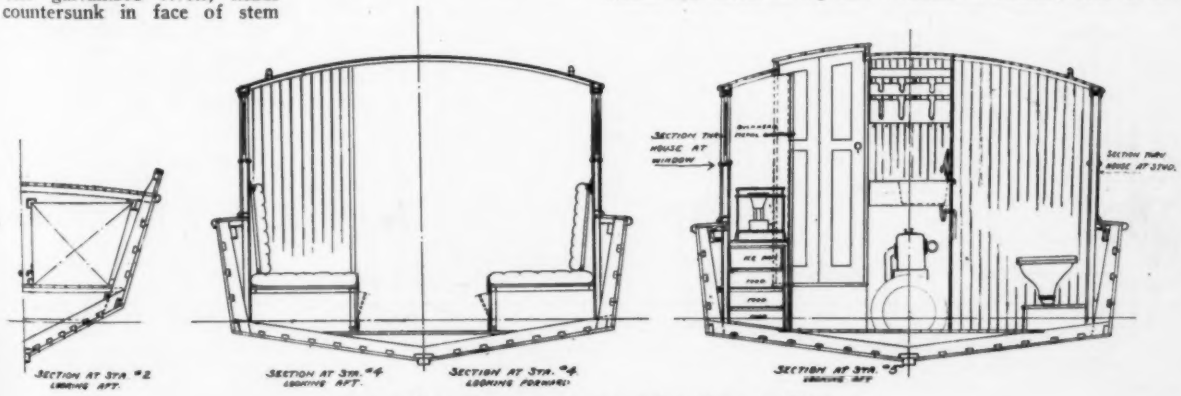
Rubbing Piece on Bottom of Keel: To be ⅜ by 3-inch brass flat secured by countersunk head brass screws to bottom of keel. If boat is used in Northern waters the stem band and rubbing piece may be galvanized iron flat.

Shaft Log: White oak or yellow pine sided 5 inches, molded 6 inches in one piece bored ¼-inch larger than the diameter of the shaft used. Shaft log to be fastened to keel as indicated by ⅜-inch diameter galvanized rods riveted each end over washers, lower ends countersunk and covered with wood plug set in white lead. Fastenings shown on drawing to be alternately to port and starboard of the shaft hole.

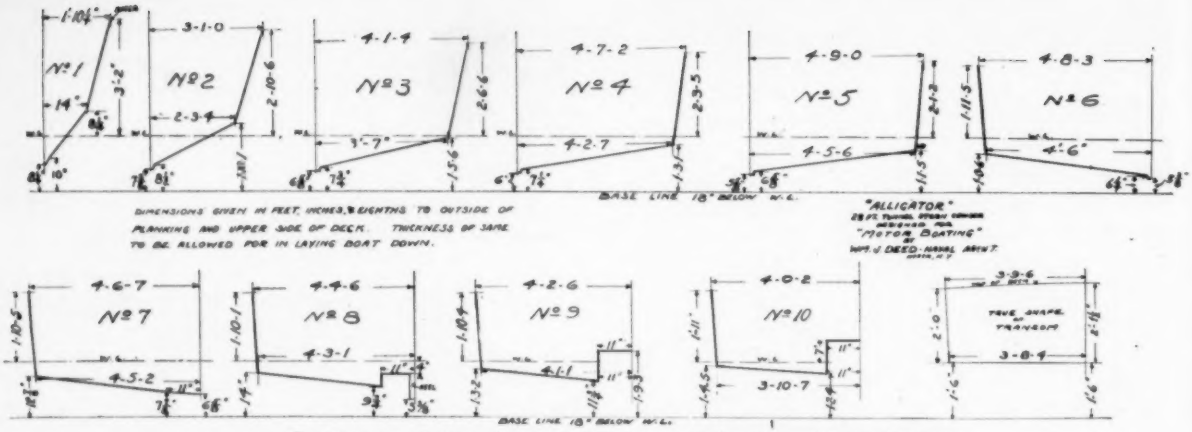
Tunnel: On center line of boat the arch timber to be white oak or yellow pine sided 4 inches, molded as per plan, fastened as indicated. Securing transom to arch timber a 1½-inch oak knee is to be riveted in place. Similar knees to be similarly placed over each upper tunnel log.

At bottom of tunnel where bottom planking meets tunnel side planking the lower tunnel log to be located, to be oak or yellow pine 2 by 2½ inches, rabbetted 1 inch for planking. Upper tunnel log to be oak or yellow pine 2 by 3 inches to follow line of upper side of tunnel; to be rabbetted as shown. Tunnel side and top planking to be white cedar finished ¾-inch thick in boards running fore and aft, seams caulked, payed with lead paint and filled flush with seam composition. Planking to be fastened by brass screws with heads countersunk and plugged. At each frame ¾-inch triangular shaped braces to be fastened to frame and to piece fitted between upper and lower tunnel logs. At each frame between upper tunnel log and center tunnel log piece to be fitted and fastened to both tunnel logs. Oak strut with lignum-vitae bearing to be 5 inches wide at shaft center, reduced above and below shaft to 3 inches. Carefully taper and smooth this strut so that least resistance will be created to the flow of water.

Frames: To be located on stations. To be ⅞-inch thick molded as follows: bottom frames 3 inches throughout, side frames 2½ inches at top and 4 inches at bottom; both to be



Construction sections for the forward portion of Alligator



Complete set of dimensioned sections for preparing the molds for Alligator

riveted together at chine by five galvanized wire nails riveted. To be notched for seam battens. Limber holes to be bored for draining water in bilge.

Floor Timbers: To be 1⅛-inch finished thickness, molded as per plan, riveted to frames and fastened to keel by two galvanized bolts. In way of engine floor timbers to be larger.

Sheer Clamp: To be yellow pine, spruce, fir, or such wood, each clamp in one piece. To be riveted to each frame by galvanized rod, ¼-inch diameter.

Shelf: To be located over clamp, to be 1¼ by 4 inches fastened to clamp and to frame.

Transom: To be 1-inch white cedar, cypress, or pine or oak, seams caulked, payed with lead paint, filled flush with seam composition. Around edges oak piece 1 by 2 inches to be fitted to take the ends of planking; transom to cover ends of planking.

Planking: To be white cedar, pine, cypress, or fir in strakes of single length. At seams 1 by 2¼ inches yellow pine battens to be fitted into notches in frames, fastened with long wood screw. Seams to be centered on battens and all plank edges to be fastened with 1¼-inch No. 9 brass screws spaced 4 inches, seams caulked with yacht cotton, payed with lead paint and filled flush with seam composition. All fastenings countersunk and heads covered with wood plug dipped in shellac or white lead.

Chine Log: To be oak or yellow pine 1⅜ by 2½ inches, fastened to frames. Lower edge beveled to suit.

Deck Beams: Forward and aft deck beams to be oak 1⅛ by 2 inches crowned and spaced as per plan. At forward end of house beam to be 2 by 2 inches.

Cabin Floor: To be ¾-inch pine laid on floor timbers and nailed to same. For a width of 18 inches at center boards to be left loose.

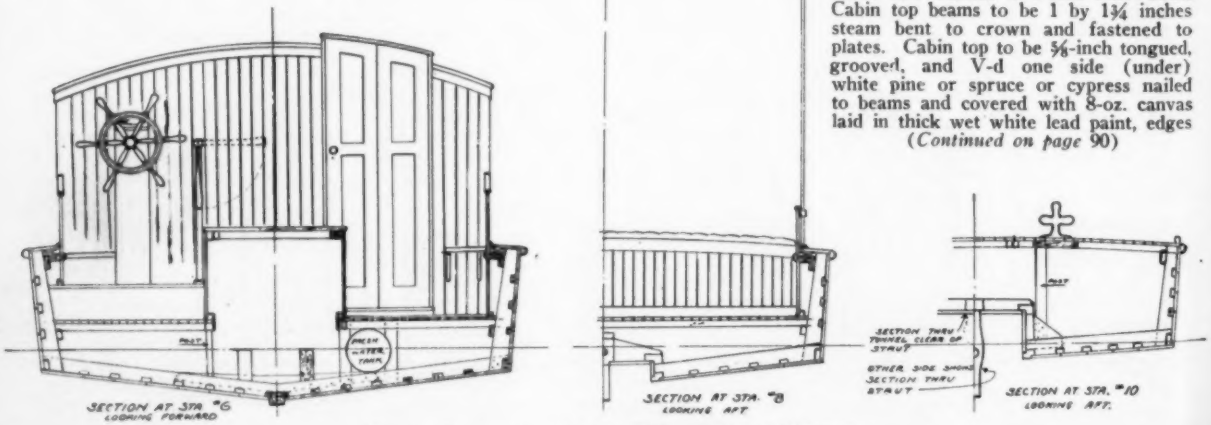
Deck: To be ⅞-inch white pine painted. Covering board to be 7 inches wide. Flush hatch aft to be same construction as deck. To be fitted with flush ring for lifting.

Engine Foundations: White oak 3-inch bed logs to be fastened to 3-inch oak floor timbers by ⅜-inch galvanized drift bolts. Floor timbers fastened to keel by two ⅜-inch galvanized drift bolts and nailed to frames from the frame side. Limbers to be provided in floor timbers. Engine bed to suit exact dimensions of the engine installed; bed shown on plan is not drawn to suit any particular motor.

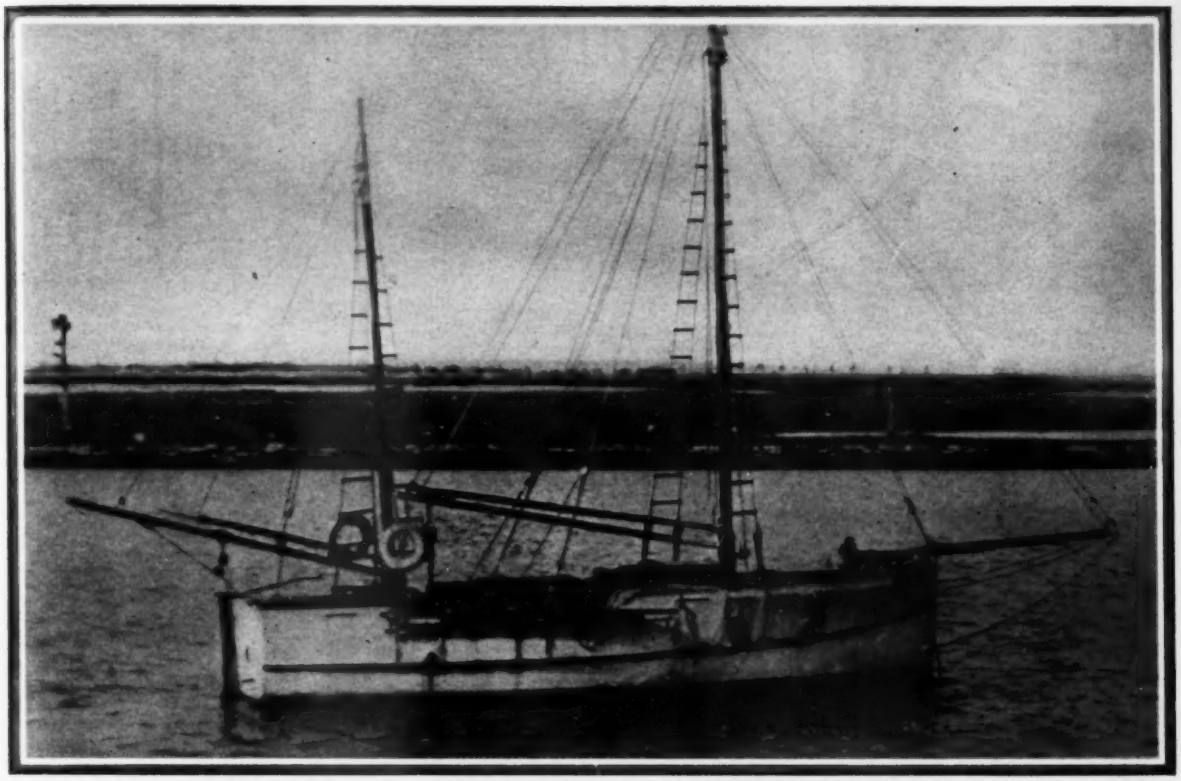
Cockpit: Floor beams to be oak 1½ by 2 inches. Decking or floor to be ¾ by 3 inches white pine painted. Flush hatch same construction as cockpit floor. Box over motor to be built to suit size of latter. Cockpit floor to extend to opening between beams. On this will be fastened rabbetted sill 1 by 1½ inches and at corner posts to be fitted, fastened to sides of boxing so as to remove with boxing. Sides to be ¾-inch tongued; grooved and V-d oak or cypress fastened to 1½ by 1½-inch piece resting on rabbetted sill (this piece not shown on plan) and entire box held down tight in position by brass hooks so that box may be easily removed. Top to have 1½ by 2-inch framing with ⅞-inch cover to remove by lifting off.

Cabin House: At positions shown between windows oak or yellow pine studs 1½ by 2 inches to be fastened to shelf and at bottom of stud. At corners rabbetted oak corner pieces to be fastened by galvanized rods driven from top through deck frame and secured under same by nuts and washer or riveted. Over tops of studs a yellow pine plate 1 by 1½ inches to be fastened and at each corner of house aft and close to rabbetted corner pieces at forward end a galvanized ⅜-inch tie rod to be fitted from top of plate to deck frame. Between windows inside and outside ½-inch oak, cypress, or mahogany to be secured in place. If cabin finish is mahogany the corner pieces will be mahogany instead of oak as above specified. Windows to be 1⅛-inch glazed with double diamond glass, to be provided with Pullman sash balances and flush handle for raising and lowering, window to drop into pocket below window sill level. Runnning between studs and secured to deck is to be rabbetted sill 1¼ by 2 inches to take outer sheathing in rabbet and below windows canvas is to be tacked and laid in thick white lead on top of this sill and turned up against inner sheathing to make seam tight and prevent rainwater driving in by window sash and running down inner seam into cabin. To effect this the outer sheathing or coaming will be fastened last. Window sills to be 1 by 3 inches extending between studs and slotted for window to pass through. To produce the effect of a continuous sill there is to be a 1-inch molding fitted between windows in line with window sills. At top inside and outside a ⅜-inch covering piece to be fastened and outside a 1-inch half-round. Cabin top beams to be 1 by 1¾ inches steam bent to crown and fastened to plates. Cabin top to be ⅝-inch tongued, grooved, and V-d one side (under) white pine or spruce or cypress nailed to beams and covered with 8-oz. canvas laid in thick wet white lead paint, edges

(*Continued on page 90*)



Construction sections for the after portion of Alligator



Tasman, the thirty-three-foot auxiliary ketch, which completed a long cruise on the southern Pacific Ocean

On the Cruise of Tasman

Thirty-Three Foot Auxiliary Ketch Successfully Battles Storms of the Southern Pacific With the Aid of Her Frisbie Motor

> *"To all to whom these presents shall come, I the undersigned Health Officer for the Port of Suva, in the Colony of Fiji Islands, send greetings:*
>
> *"Whereas the ship called Tasman, whose master, Captain J. S. Drever, is about to sail from the said Port of Suva, the Colony of Fiji, for the Port of Sydney, Australia, and other places beyond the seas, with two persons on board, including the master.*
>
> *"Now, know ye, that I, the said Health Officer, do hereby make it known to all men, and pledge my faith thereunto, that at the time of granting these presents, no pestilence, plague, or any dangerous disorder existed in the above port or in its neighborhood."*

As set forth above, the authorities of Suva, Fiji Islands, gave their consent to the sailing of the 33-foot auxiliary ketch Tasman from the harbor on her long voyage across the stormy waters of the southern Pacific Ocean to Sydney, Australia. The first stop was to be at Conway Reef, some 300 miles away, which was only a small portion of the total of 2,800 miles to Australia.

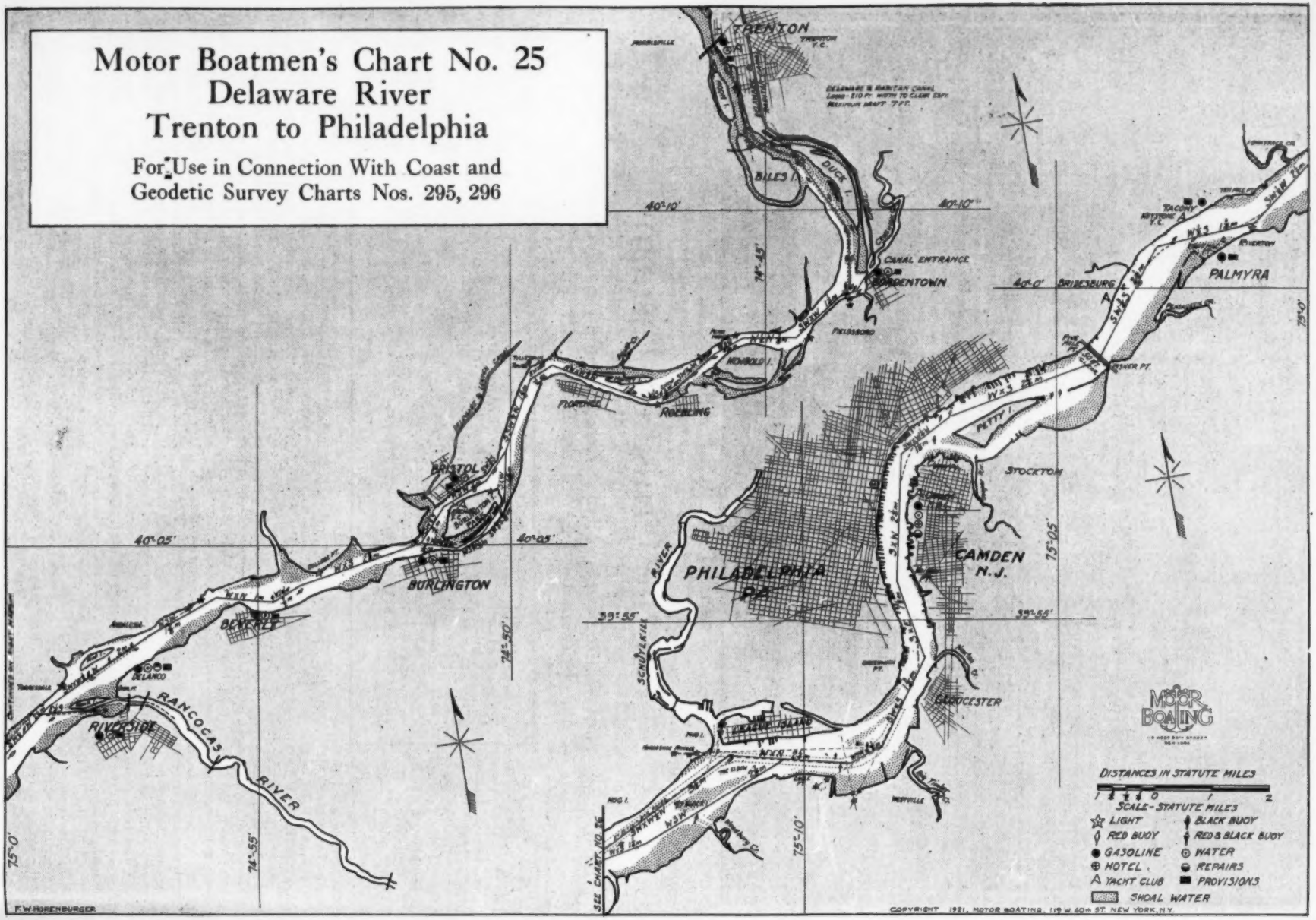
Many transoceanic voyages have recently been undertaken by small motor boats, but none on the order of this one. Generally, voyages of this nature are undertaken in boats which have been built for the particular journey. Expert engineering and boat building knowledge has been freely used and generally the crews have been persons directly or indirectly connected with the industry. Tasman does not belong to this class. This boat is already three years old and its Frisbie motor of 16 h.p., running on kerosene, has been called upon for hard, continuous service in its lifetime. At the beginning of this voyage no professional advice was sought—in fact, the motor manufacturers only learned of the journey long after it was well under way.

On this voyage to Sydney, Tasman was called upon to weather more severe storms than have ever previously fallen to the lot of a boat of this size. For days at a time—in one instance, six days continuously—it was necessary to heave-to and permit the storms to blow themselves out. The entire voyage consumed forty-four days and the severe treatment to which the boat was subjected demonstrates the high point of development which has been reached in boat and engine construction.

Tasman was built some three years ago from designs by her owner, Logan Morrisby. Her appearance is slightly out of the usual, as she was built particularly for seaworthiness, utility and comfort. The matter of speed was a secondary consideration and was sacrificed in favor of the other good features. Her dimensions are 33 feet 6 inches in length, while her beam is 10 feet with 5-foot 6-inch draft. Her entire timbers are native to the Fiji Islands, being mainly kauri with Australian spotted gum frames. There is a comfortable main cabin under the raised deck forward, while the 16 h.p. Frisbie motor is installed amidships. The after cabin is used for stores. The motor is the standard two-cylinder 16 h.p. type adapted to run on kerosene, and is of 6 inches bore and stroke and has been used in this boat commercially.

Logan Morrisby, the owner, has spent two score years among the South Sea Islands and is a local authority on subjects pertaining to them. He cruises continuously among

(*Continued on page* 94)


Motor Boatmen's Chart No. 25
Delaware River
Trenton to Philadelphia
For Use in Connection With Coast and
Geodetic Survey Charts Nos. 295, 296
TRENTON
BORDENTOWN
BRIDESBURG
PALMYRA
BURLINGTON
BEVERLY
DELANCO
RIVERSIDE
RANCOCAS RIVER
BRISTOL
FLORENCE
ROEBLING
NEWBOLD I.
FIELDSBORO
CANAL ENTRANCE
DUCK I.
BILES I.
STOCKTON
PETTY I.
CAMDEN
N.J.
PHILADELPHIA
PA.
GLOUCESTER
SCHUYLKILL RIVER
DELAWARE & RARITAN CANAL
Locks - 110 Ft. Width to Clear Entr.
Maximum Draft 7 Ft.
40°-10'
40°-05'
39°-55'
74°-45'
74°-50'
74°-55'
75°-0'
75°-05'
75°-10'
DISTANCES IN STATUTE MILES
SCALE - STATUTE MILES
LIGHT
BLACK BUOY
RED BUOY
RED & BLACK BUOY
GASOLINE
WATER
HOTEL
REPAIRS
YACHT CLUB
PROVISIONS
SHOAL WATER
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Cruising on the Delaware

The First Portion of the Delaware River From Trenton to Philadelphia is the Beginning of the Inside Route to Florida

ONE of the simplest waterways to navigate in the country is the Delaware River. All courses necessary to safely travel this winding channel are plainly indicated by well established ranges on shore so that the pilot, even though he may be traveling in totally unfamiliar waters, can still be assured of remaining in deep water at all times. It would seem that traveling by night is almost simpler than traveling these waters during daylight hours. The ranges are all so devised that the moment the pilot permits his vessel to slip from his proper course, the lights are obscured. In order to get back into the channel, it is only necessary to alter the course sufficiently so that the lights again become visible.

From Trenton to the vicinity of Bordentown, the Delaware River is rather a narrow stream. The channel is dredged and it is advisable for the stranger in these waters to confine himself strictly to the channel between the many buoys which clearly define it. At Bordentown, vessels traveling south from New York waters will leave the Delaware and Raritan canal and enter upon the river. Upon leaving the canal lock at Bordentown, the steamboat wharf on the east bank should be left about 125 feet to the westward. The course from here will be S W ⅛ S with Bordentown range frontlight, which is a white post on the south bank ⅜ miles distant and a little on the starboard bow. A black buoy is left about 50 feet on the starboard hand and the course gradually hauled to the westward so as to follow the channel and pass about midway between the light and the horizontally striped buoy. A course S W x W position about midchannel above Newbold Island, changing there to W ½ N when the Penn Manor range closes. From here to Roebling the course will follow a mid-channel position between a line of well marked buoys. After passing black spar off Kingora, one can head directly for the large water tower at Tullytown on the Pennsylvania shore. On this stretch one can keep about 500 feet off the southern bank to Florence. In making the sharp bend to port here, keep in mid-channel and draw in to about 300 feet from the western bank for a distance of about ⅜ of a mile below Bristol to abreast the yacht club wharf there. Burlington Island, opposite Bristol, is a very popular rendezvous for motor boat parties and is only a short run from Philadelphia. Supplies and gasoline may be obtained here as well as at other points along the river. The picnic ground at Burlington Island is a public park which is open from the end of June to the middle of September. Just below the island is the village of Burlington, where supplies can also be obtained. There is sufficient water at both Bristol and Burlington so that boats can approach the wharves and load their ice and gasoline directly without having to tranship it in small boats.

Leaving Burlington astern one can steer directly for College Point light until within a quarter mile from it. It should be passed at a distance of about 600 feet and the black buoys just below passed on the starboard hand as is customary in going down stream. An old wharf on the northerly bank will form a guide for the next course which is W x N for about one mile. This wharf is held slightly on the starboard bow until within about 500 feet of it and then a turn is made and a course of W S W followed, keeping the wharf at Torresdale a little on the starboard bow and the concrete tower and high chimney a little on the port bow. A dredged channel will be found abreast of Mud Island, the buoys of which clearly define it. A lighted range will be left astern in passing through this channel and, with the additional guidance of the buoys, no difficulty should be encountered. The Torresdale light will be found on a wharf close by and can be passed at a distance of about 800 feet from it.

Just before reaching here, the little village of Delanco on the New Jersey side offers the services of a well equipped boat shop and marine railway which can take care of yachts and small craft, should repairs be required. Should it be necessary to stop at Delanco, a sharp turn must be made to port after passing the last pair of buoys on the Mud Island range. A church spire in the village can be used as a guide and when within 700 to 800 feet of the shore, head up for the landing. Rancocas River offers convenient anchorages for small boats which wish to lay in quiet water. To enter this river the range below Hawk Island will have to be used until well abreast the island, from this point standing to Diehl Point on the left bank until about half way between the point and the island, from which the course is again changed to head for the draw on the trolley bridge.

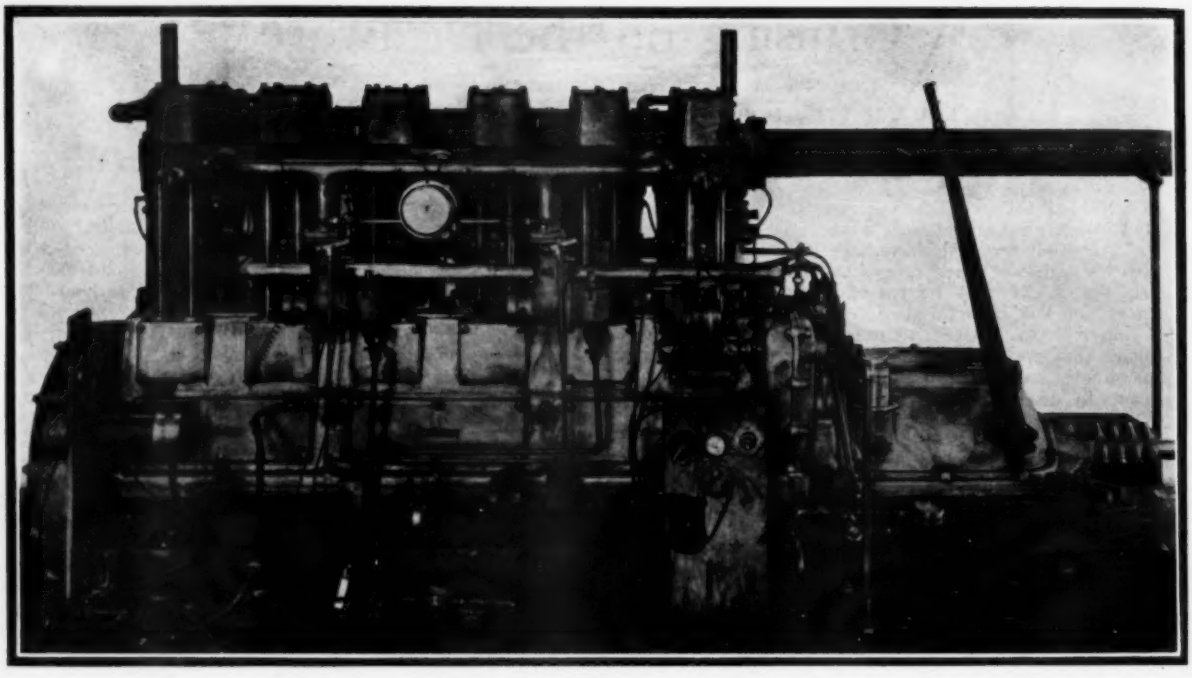
The course below Torresdale is practically a straight line to the prominent club house and flag staff on the end of the pier at Riverton, a little on the port bow. The course will be S W ½ W and the distance two and one-half miles. A good anchorage can be had here just below the Yacht Club and supplies of all kinds can also be secured. The Riverton light should be passed at a distance of about 500 feet and the red and black spar buoys at Eight Mile point can be passed on the port and starboard sides, respectively, while running on a course of W ½ S. This course approaches the mouth of Frankford Creek, just below Tacony, at which place supplies, provisions and fuel may be obtained if required. Just below are a number of yacht clubs at which one may stop and inquire for more complete local information. The railroad bridge across the river just below here has a 50-foot clearance above the water-line and in addition is a draw bridge for larger vessels.

A mid-river course can be followed when past the bridge and anchorage can be made on the eastern side of the river, either at Petty Island, two miles below the bridge, or between Kaighn Point and Gloucester, from 5 to 7 miles below the bridge. At Camden, New Jersey, repairs of any kind can be effected and supplies of whatever kind desired can be readily secured. The numerous wharves on the Philadelphia water front make it advisable not to attempt to stop there with a small boat, but to lay at one of the anchorages mentioned or at some of the yacht clubs nearby. The adjacent clubs are all close to transportation lines.

MOTOR BOATING'S NEW CHART SERIES

The third series of MoToR BoatinG's popular charts begins with No. 25, which covers the Delaware River from Trenton to Philadelphia. Others in this series which follow will complete the route to the sea via the Delaware River as well as cover many interesting stretches of cruising waters on the way south and along the coast. It is planned to issue these about as listed below:

No. 25	**Nov., 1921**	**Delaware River, Trenton to Philadelphia.**
No. 26	**Dec., 1921**	**Delaware River, Philadelphia to Smyrna.**
No. 27	**Jan., 1922**	**New Jersey Coast, Cape May to Little Egg Inlet.**
No. 28	**Feb., 1922**	**New Jersey Coast, Little Egg to Barnegat Inlet.**
No. 29	**March, 1922**	**New Jersey Coast, Barnegat Inlet to Sandy Hook.**
No. 30	**April, 1922**	**Chesapeake Bay, Smith Point to Cape Charles.**
No. 31	**May, 1922**	**Potomac River to Lower Cedar Point.**
No. 32	**June, 1922**	**York and James Rivers.**
No. 33	**July, 1922**	**Delaware Coast, Cape Henlopen to Chincoteague Inlet.**
No. 34	**Aug., 1922**	**Virginia Coast, Chincoteague to Cape Charles.**
No. 35	**Sept., 1922**	**North Carolina Coast, Cape Henry to Beaufort.**
No. 36	**Oct., 1922**	**Carolina Coast, Beaufort to Charleston.**



The Newest Gasoline Marine Motor

A Six Cylinder Machine Developing 300 H. P., Perfected by the Consolidated Shipbuilding Corporation in Addition to the Construction of New Yachts

PROGRESS in marine gas engineering is being made. The engineers of the Consolidated Shipbuilding Corporation at Morris Heights, New York, have completed a new model six cylinder gasoline marine power plant known as Model R. The Consolidated Shipbuilding Corporation, operating the largest yacht works on the eastern coast, find time to develop new motors and build them in addition to the construction of the yachts themselves. Among the most recent boats completed at this yard can be mentioned the large steam yacht Lyndonia and Speejacks, now on its way around the world.

The motor is a most compact unit and will develop 300 H.P. when turning at 1,300 r.p.m. The bore and stroke of the six cylinders is 6¾ inches by 8½ inches stroke and the weight has been kept down to 4,000 pounds complete. It is of the overhead, dual valve, separate head type with two camshafts. There are separate substantial push rods for each valve and rocker arms under a protecting cover translate the push-rod motion to the valve. The valve cover is tight and the pressure oiling system distributes a portion of its lubricant on the valve actuating mechanism so that these parts are continuously and sufficiently lubricated. The first tests made on this motor were very successful and it was kept in full operation for a period of 13½ hours at full speed without any adjustments whatever. There is no reason to suppose that it could not have continued to operate indefinitely had it been desired.

The details of this motor are interesting. There are four valves to each cylinder, each of which is operated by its individual push-rod from the camshaft, which is below in the upper crank case. The push-rods can be plainly seen in our photograph and are very substantial members of the machine. The inlet and exhaust valves are very large and of the taper seated type. They are all identical and therefore interchangeable.

Aluminum has been extensively used in the construction of this machine. The bed casting is a single piece of this metal and includes the reverse gear and thrust bearing in the same housing. The bearings in this piece are bored for removable bronze babbitted shells. A single aluminum casting forms the upper half of the base and is exceptionally deep and well bolted to the base casting. A flange to which the cylinders are bolted is centrally located near the center of piston travel and balances the side thrust of the piston perfectly. The cylinder castings are separate with integral water-jackets and are formed of a special grade of cast iron, all surfaces in the combustion space being machined. The advantage of separate cylinder castings is well recognized by engineers and the expansion and contraction of the cylinders in the working of the motor is more readily absorbed. Cylinder heads are also cast iron and are bolted to the cylinder with studs. A gasket of copper asbestos is placed in between to provide a gas type joint. The head is machined for the valves and guides, the exhaust from each valve, having separate passages to the exhaust line.

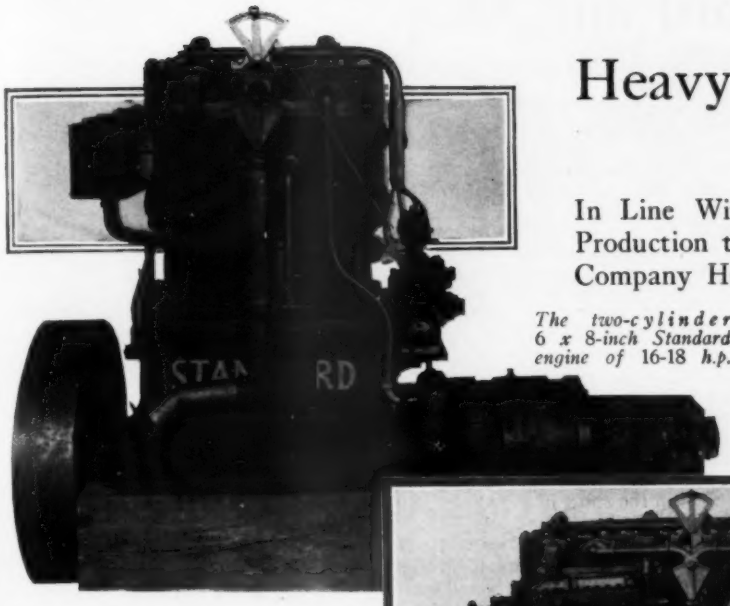
Forged nickel steel is the material used in making the crankshaft. This is cut out of a solid billet of steel and is machined down to the correct sizes required. It is 3½ inches in diameter and has a bearing between each cylinder drilled for the pressure oil system. There is a flange on the forward end to which the flywheel is attached. Connecting rods are also made up of this same material and are machined all over. The bottom end is provided with a babbitted shell bearing, while the top end uses a phosphor bronze bushing.

Two oil pumps are used to provide oil to all wearing surfaces by a positive pressure system. The system draws all the oil from the engine base by means of one pump and discharging it through a cooler and on to a supply tank. The other pump draws the oil from the tank and discharges it through a manifold on the bottom of the bed to the main bearing, from which it goes through the hollow crankshaft to the crank and wrist pin bearings. All other bearings and pins on the motor are also taken care of by this pressure system. A large thrust bearing of the roller type is located in an oil tight housing on the after end of the main bed plate.

Two separate and distinct systems of ignition are provided for this machine. A two spark high tension Berling magneto and a separate Delco distributor system provide the necessary electrical impulse for firing the cylinders at the proper time. Other electrical equipment is a two unit Bijur starting system. This is a 12-volt equipment and operates by engaging a ring gear on the flywheel with the pinion of the starting motor. The little starting motor has ample capacity to turn the large machine over without apparent effort.

Heavy Duty Standard Motors

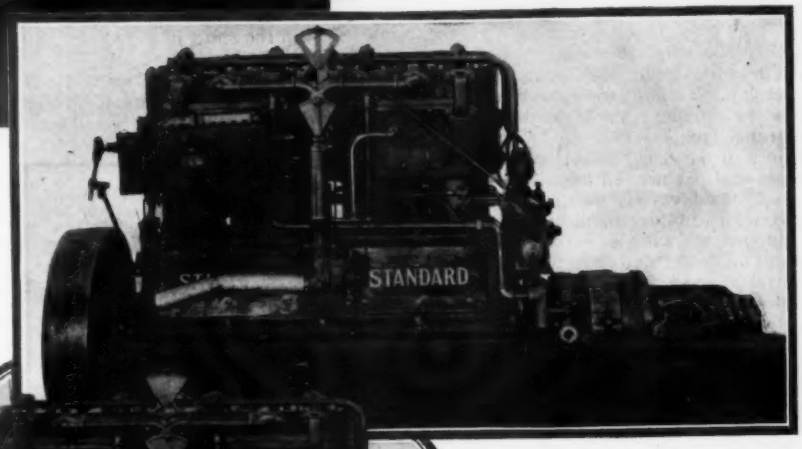
In Line With A New Policy of Quantity Production the Standard Motor Construction Company Has Reduced Prices of All Models



The two-cylinder 6 x 8-inch Standard engine of 16-18 h.p.

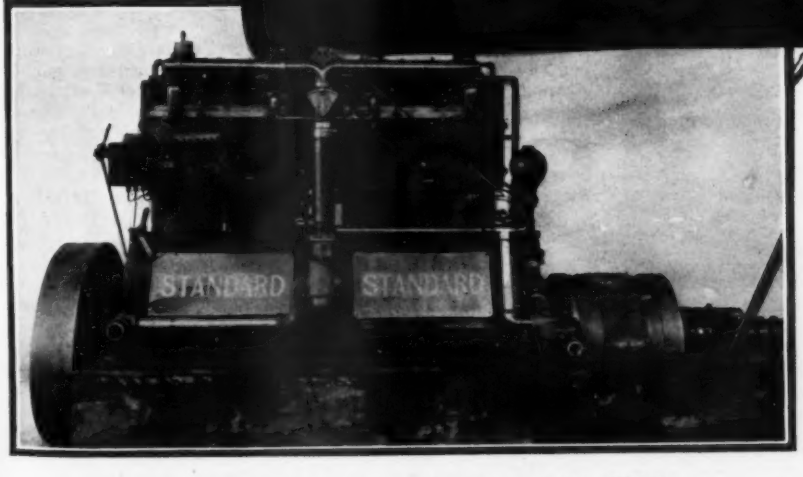
STANDARD motors have always been true to their name, that is, standard for the service for which they were intended. In these days when the high-speed motor is performing so spectacularly in racing craft and thus receiving more than its share of the public's attention, it is quite natural for many to lose sight of the fact for a time, that the slow-speed, heavy duty is just as popular as it ever was for the ordinary type of cruising motor boat and for commercial purposes. The Standard motor will always remain standard for this service and never can be replaced.

In keeping with the spirit of the times, the Standard Motor Construction Company have reduced their prices on all Standard models. These have been brought down to practically pre-war prices and are based on quantity production, as this company is looking forward to a prolonged period of prosperity in the marine field, especially in the type of boat which makes motor boating worth while.



Four-cylinder 5 x 6½-inch Standard engine of 20-24 h.p. This engine has the smallest cylinder dimensions of any built by this company

A four-cylinder motor in larger size 32-37 h.p. 6 x 8-inch bore and stroke. This unit has four cylinders of the same dimensions as the two-cylinder 16-18 h.p. model



A large motor 8 x 10-inch bore and stroke developing 65-75 h.p.

Yard and Shop

Notes of Interest to Both Owner and Manufacturer

Ambrose Channel Audio Piloting Cable in Commission

Arrangements have just been perfected whereby the operation and maintenance of the Audio Piloting Cable in New York Harbor will be taken over by the Lighthouse Service of the Department of Commerce. As announced in MoToR BoatinG September, 1920, the Navy Department was conducting experiments with this cable and successful tests were made at that time. The destroyer Semmes was piloted through Ambrose Channel while the helmsman was blindfolded, the entire guidance of the ship being entrusted to the audible signals from the submerged cable in the center of the channel below the ship. The apparatus enabling vessels to navigate through the harbor entrance has been perfected to the point where it is feasible for small motor boats and yachts. In addition to naval vessels and vessels of the Lighthouse Service many big steamships are being equipped with the device which eliminates all delays due to fog at the harbor entrance and will result in the saving of untold amounts by permitting ships to enter or leave the harbor in spite of fog.

The cable will be in operation continuously in the same way as other aids to navigation and all vessels which are equipped to receive the signals which it gives will be enabled to avail themselves of its aid.

Tests will be undertaken soon on a small motor boat to show the adaptability of the device to the small craft as well as to the largest vessels.

It is only a matter of a few years when all our principal harbor entrances will be protected by these piloting cables.

Elco Has New Storage Service

In discussing the needs of boats and boatmen in the line of layup service Thomas L. Hansen said, "Our service to the owner of an Elco boat begins with the sale and never ends." Not enough can be said for the part the Elco Works have taken in making the Stock Boat a reality. Not content with selling their client they have found that the best way of keeping him sold is to sell him not the largest boat he can afford but the one most suitable for not only his purse but for his requirements. Mr. Hansen's theory is, get him interested in the sport in a small way, keep him satisfied with his purchase and he will sell himself a bigger boat before long.

Keeping pace with the times and conditions, an owner of a Cruisette can now bring his boat to the dock at Bayonne and forget it till he is ready to take it away in the spring. His boat will be hauled out, washed, bilge cleaned, an inventory taken of every item aboard and sent to the owner, the boat put in covered winter storage and put back in the water ready to be sailed away. The service costs just 50% less than it did last season. It is just another instance of what Elco is doing to put boating on the plane it rightfully belongs. There has long been need for just this kind of service.

Seacoast, a new oyster boat just beginning its service in New Haven Harbor. This boat is very beamy and has a draft of 6½ feet. She is equipped with a 6-cylinder Mianus improved Diesel motor which drives her at 10½ knots. In addition, the motor is equipped to handle four dredges which hold 8 bushels each. These engines are rapidly replacing steam plants in boats of this type and their efficiency and economical operation make them particularly suited for this hard work

The seventeenth National Motor Boat, Ship and Engine Exposition will be held in the Grand Central Palace, New York, February 17 to 25, 1922.

DATES FOR AMERICAN POWER BOAT ASSOCIATION

SOUTHERN RACES:

Cruiser Race, Miami to Palm Beach and return, Saturday, Feb. 11.
Cruiser Race, Miami to Key West, Saturday, Feb. 18.
Cruiser Race, Miami to Havana, Saturday, Feb. 25.
Races for the Fisher-Allison Trophy, Miami, Thursday, Friday and Saturday, March 2, 3 and 4.
Races for the Wood-Fisher Trophy, Miami, Tuesday, Wednesday and Thursday, March 7, 8 and 9.

NEXT SUMMER'S RACES:

Pageant of Progress Races, Chicago, July 24 to Aug. 5.
Fisher-Allison Races, Hamilton, Ontario, Aug. 17, 18 and 19.
Wood-Fisher Races, Detroit, during the period from Aug. 26 to Sept. 5.

Lake MacDonald in the Glacier National Park is an ideal place for motor boating. Miss Wetona, pictured here, is one of the new additions to the fleet of the lake. She was built by the Ramaley Boat Company and is powered with a 32 h.p. Capitol marine motor. A speed of 60 m.p.h. is claimed for the boat

Waterway League Race on Hudson

A popular race held by the New York Motor Boat Club last month to Forest View and return was participated in by fourteen cruisers and six open boats. Comm. E. L. Kieger, the champion prize donator, has presented a series of trophies to the club for competition in this event. Special prizes were awarded to the first three members of the Waterway League to finish. Foto, the fast cruiser entered by G. T. White, was the winner in the cruiser class, followed by Sunkist, entered by A. Simonson of Sewaren, and Buddy, H. V. Brewster, in second and third places.

The winner in the open boat class was Amorita, W. T. Randolph, with Fleetwood, J. P. Stoltz, second. In several reports of this race Fleetwood was erroneously stated to have been the winner, which however was not the case.

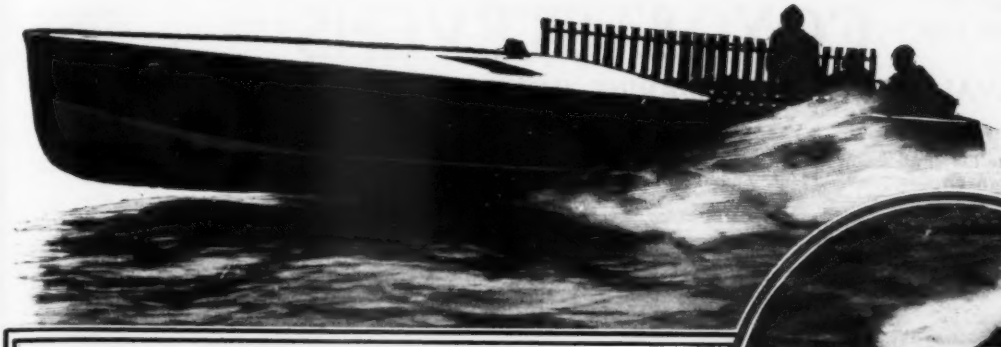
Speedway Engines Going Fast

The new eastern representative for Speedway Motors, A. G. Griesse, has made a splendid showing in distributing these motors during the last several months. "Art" is well known in the marine field and apparently has found little difficulty in selling this popular make of motor. A model Z motor has been installed in the tender for the big yacht Aloha and is now on its way around the world.

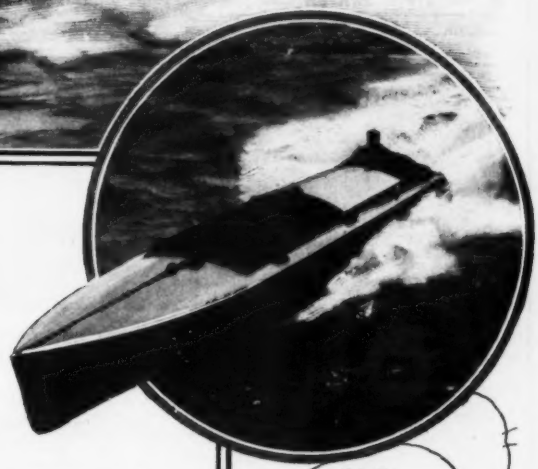
Correct Lubrication

A booklet on the "Correct Lubrication of the Oil Marine Motor" has been prepared by the Vacuum Oil Company of New York and the various lubrication systems and the correct grades of oil for every motor boat engine has been determined and is described. The chart of recommendations will inform you of the correct grade of oil to use for your particular motor at all times. Copies can be obtained from the Vacuum Oil Company, New York.

(*Continued on page* 66)



Miss America II



Baby Gar

Gar Wood's Trio— Triumphant Over All

THIS year's Detroit Yacht Club Regatta was a great occasion for Gar Wood. His *Miss America* successfully defended the Gold Cup. His *Baby Gar* —a new Smith 33-footer—won the Wood-Fisher Trophy Race of 150 miles, at an average speed of 42.5 m. p. h.

In capturing the Lake George Trophy for the One-Mile Speed-Boat Championship of North America, Mr. Wood's *Miss America II* set a new world's record of 80.567 m. p. h.—doing the third down-stream mile at 81.466—the fastest speed ever made by watercraft.

And best of all, *Miss America II* won the British International Trophy against *Maple Leaf VII*, the British Challenger, *Miss Chicago* and her own older sister, *Miss America*—the boat that brought the famous Harmsworth Trophy back to the United States.

Gar Wood's three winners are products of the C. C. Smith Boat and Engine Company of Algonac, Mich. And it goes without saying that they are

Valsparred, of course.

VALENTINE'S
VALSPAR
The Varnish That Won't Turn White

All photos Rosenfeld, N.Y.

VALENTINE & COMPANY
Largest Manufacturers of High-Grade Varnishes in the World—Est. 1832
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For your dealer's name and 15c in stamps, we will send you a 35c sample can of Valspar or Valspar Varnish Stain—enough to finish several square feet of surface. Fill out Coupon.

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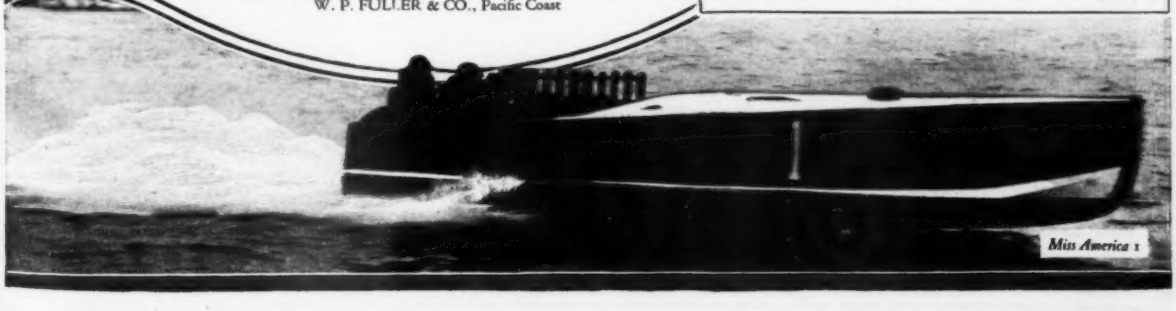

Miss America I

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NAVAL ARCHITECTS
ENGINEERS
YACHT BROKERS
MARINE INSURANCE

HENRY J. GIELOW, Inc.

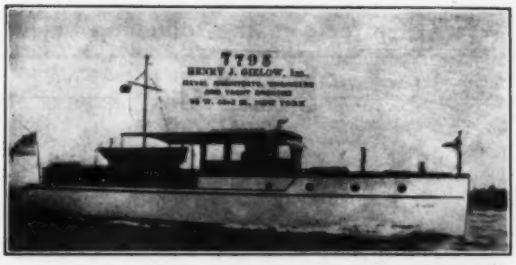
25 WEST 43rd STREET, NEW YORK

Tel.: Murray Hill 9134
Cable Address:
Crogie, New York
A.B.C. Code

Plans and specifications for new yachts of any size or type should be prepared now to assure delivery for next year. Have plans of new yachts, all types, on file now.

We have a most complete and up-to-date list of steam and motor yachts of all sizes, sail, auxiliary, and houseboats on file in our office, kept constantly up-to-date by a thorough and comprehensive canvass of the entire yachting field from time to time. We are in a position to submit full information on any type of boat upon request.

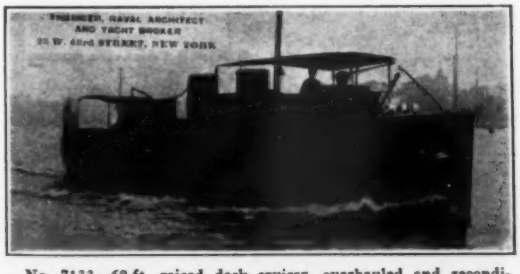
No. 8165—For Sale—Consider 50-60 ft. auxiliary part payment. New houseboat 45 x 13 x 3 ft. Speed 9 miles. In commission. Double and single stateroom, saloon and bath. Also deck saloon. Delco lighting plant. All complete and perfect condition. Henry J. Gielow, Inc., 25 W. 43rd Street, New York City.



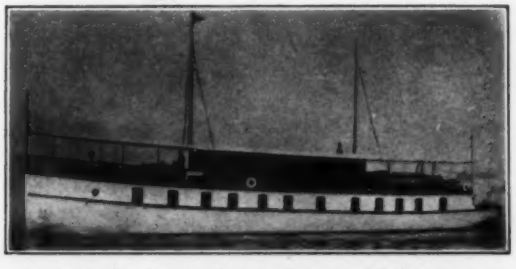
No. 7795—For Sale—45 ft. bridge deck cruiser. Built 1920. Speed 12-14 miles. 100 H.P. Van Blerck motor. One double stateroom, main saloon with 2 Pullman berths, toilet room, galley, etc. Price attractive. Henry J. Gielow, Inc., 25 W. 43rd Street, New York City.

No. 8080—For Sale—Charter—New modern 85 ft. twin-screw cruising houseboat. Deck dining saloon and galley. 2 double, 3 single staterooms. Hot water heat, 3 baths. Shoal draught makes attractive type Florida cruising. Two 50 horsepower motors give speed 10 miles. Good sea boat. Henry J. Gielow, Inc., 25 W. 43rd St., New York City.

No. 7002—For Sale or Charter—Finest yacht of type available. 138 ft. twin-screw power yacht. Two 300 H.P. Standard engines. Dining room and social hall on deck; three double and one single staterooms; two bathrooms. All furnishings new 1920. Henry J. Gielow, Inc., 25 W. 43rd St., New York City.

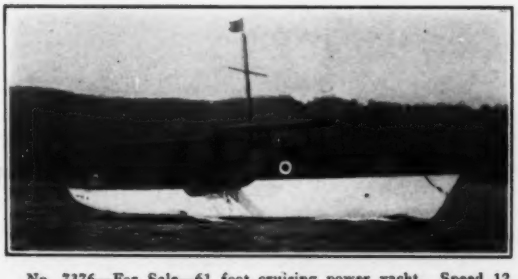


No. 7133—68-ft. raised deck cruiser, overhauled and reconditioned spring 1921. Sterling engine, speed 12 to 14 miles. Interior finish white enamel, two double staterooms, large galley, shower. Exceptionally heavily constructed boat, fine sea boat. Owner anxious to sell, having purchased larger yacht. Will consider real estate trade. Inspection and trial trip in New York. Henry J. Gielow, Inc., 25 W. 43rd Street, New York City.



No. 8098—For Sale or Charter—Desirable 100 ft. twin screw cruising houseboat. Speed 12 miles. Two 75 H.P. Winton motors. Deck dining and lounging room, 3 double staterooms, 2 staterooms with upper and lower berths, 3 bathrooms. Handsomely fitted and furnished. Henry J. Gielow, Inc., 25 W. 43rd Street, New York City.

No. 7077—For Sale—Particularly desirable 80-foot twin-screw power yacht. "20th Century" 50-60 H.P. motors, new 1919. Deck dining room, two double staterooms, bathroom. All furnishings and equipment new 1919. Excellent condition. Henry J. Gielow, Inc., 25 W. 43rd St., New York City.



No. 7376—For Sale—61 foot cruising power yacht. Speed 12 miles, 80 H.P. motor new 1920. Delco lighting plant new 1921. Double stateroom, two saloons. Sleeps six. All in first class condition. Henry J. Gielow, Inc., 25 W. 43rd Street, New York City.

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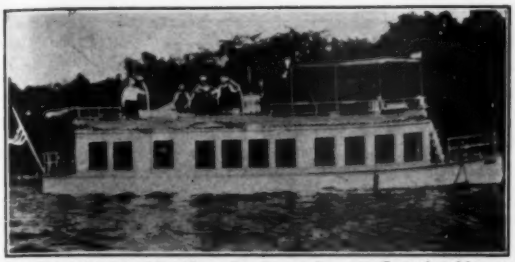
Advertising Index will be found on page 104



For Sale—50-ft. Cruising Houseboat, tunnel stern. Just the thing at this time of the year for a southern cruise. This boat is 50 ft. x 9 ft. x 2 ft. draft. Have just installed a new 55 H.P. Sterling heavy duty engine, self-starter, electric lights, air compressor, bathroom complete, two private double berths, and accommodation for four to sleep in front cabin. Hot and cold water tanks, large icebox, sink, and double oil stove in galley, and two hole hard coal stove in engine room. Speed guaranteed at 12 miles per hour. In commission right now on a hunting trip near Oshkosh, Wisconsin. Thomas Andrazyk, 1517 Haddon Ave., Chicago, Ill.

Photo by Edwin Levick

READY FOR IMMEDIATE SHIPMENT SOUTH

For Sale—35 x 6 ft. 6 in. Hacker Runabout "SNAPSHOT," GR-6 Sterling Engine, guaranteed speed 35 M.P.H. Solid mahogany and salt water fittings throughout and completely equipped with cushions, chairs, windshields, etc. In perfect order and completely refinished. Only reason for selling want faster boat. Act quickly before Detroit River freezes. John W. Stroh, 909 East Elizabeth Street, Detroit, Michigan.

For Sale—Cabin cruiser, ocean going, flush deck 52 x 12, 4, heavy duty Standard engine, two lavatories, two cabins, mahogany trim, attractively furnished, one man control, $4,500. Canadian Money. A. E. Paradine, 38 Munro Park Ave., Toronto, Canada.

Position Wanted—Naval architect, 20 years' experience, desires position with shipyard, or yacht building yard; or designing and yacht brokerage firm. Address Naval Architect, Room 602, 136 S. 4th St., Philadelphia, Pa.

Island For Sale—About two to three acres—Maine coast near Boothbay. Wooded, has 5-room furnished house. Fine new anchorage, and fishing. Price $850 today. Worth $2,000. E. F. Merrow, Hyde Park, Mass.

One Winton 6 cyl. engine, 4½ in. bore (60 H.P.), equipped with Stromberg carburetor, and Eisemann magneto. Pressure force feed (oil) to all main and connecting rod bearings, also timing gears. Large centrifugal water pump. Equipped with distributor and check valves to connect to tank for air starter. Side hand hole covers on crank case. Excellent condition. Price $95. L. I. Bridegam, 240 Penn St., Reading, Pa.

For Sale—As I am building a much larger boat will sell my express cruiser, dimensions 62 ft. x 11 ft. x 3 ft. draught, equipped with two six cylinder two hundred horse power Hall-Scott motors, with cruising speed twenty-five miles per hour. Three years old hull of cedar and white oak. Joiner work mahogany throughout. Has independent generator unit and electrically lighted; sleeping capacity for eleven persons. For further information and particulars address R. C. Durant, Room 712 First National Bank Building, Oakland, California.

Wanted—Position on yacht or houseboat. Man and wife, woman to cook, man in any capacity. Understand motors and boats. Wages small, good conditions essential. References. Jack H. Long, 1 Lanes Court, Lowell, Mass.

St. Lucie River Home—Sacrifice—To close estate. Winter residence at the confluence of the north and south forks of the St. Lucie River, beautiful view, 4½ acres attractive grounds, ornamental trees and shrubs and citrus fruit in profusion. 2½-story residence, furnished, modern, 8 bedrooms, 4 private baths, private water plant, electric lights, etc., sea wall, wharf, boat house, work shop. Would be attractive to wealthy family or to hotel man. Price $40,000. Half cash. We have several Indian River front places for sale, ranging in price from $2,000 up. Also many groves and farms in the Indian River section. Booklet, 148 illustrations and list of property, 5c in stamps. Goodwin & Baker, Realtors, Fort Pierce, Fla.

Exceptional opportunity for right man with some cash and knowledge of marine motors; a banker who is not familiar with this class of work has acquired all the business, parts, patterns and equipment from manufacturer of well known marine motors (25-30 h.p.); large profits and hundreds of inquiries from all over the world; one order for fifty from one dealer; under proper management and with small investment business will net $50,000 first year, and double the second. What I offer was capitalized at $150,000 and cost me under foreclosure proceedings around $30,000; no expensive buildings or equipment required; can easily be moved anywhere; will sell at a bargain, all or part interest, and if you have $5,000 cash and some good paper or clear property might consider trade as part payment; if interested address A. A. Werner, Bowling Green, Ohio.

TRIMOUNT WHISTLE BLOWER OUTFITS

Blower runs by friction contact with engine fly-wheel. Whistle of brass, nickel-plated.

Made in 3 sizes.

TRIMOUNT ROTARY HAND BILGE PUMPS

All bronze composition. Suction lift 6 to 20 feet. A lifelong convenience.

Made in 3 sizes.

TRIMOUNT ROTARY POWER CO.
20 Heath Street Boston, Mass.
(Factory: 292 Whiting Ave., E. Dedham, Mass.)

For Sale—12-cylinder H.P. Van Blerck Motor formerly installed in the famous "Whip-po'-Will, Jr." This engine established the official world's mile record of 70.15 m.p.h., which was unbeaten for three years. Motor has had best of care and comparatively little service. Ideal for express cruiser. Will be sold far below present value to most acceptable bid, f.o.b. Lake George. Write to A. L. Judson, 30 East 42nd St., New York City.

Pierce-Arrow 5-ton trucks, rack bodies. Very good condition. Always used in our own service. Will sell cheap for quick sale. Motor Truck Renting Corporation, 530-532 West 44th St., New York City.

FREE Illustrated Literatures. Outboards, New and Rebuilt Engines. Universal Joints, Pumps, Clutches, Gears, Aerials, Hyde's, Gordon Reversible Propellers, etc. Canadian Boat & Engine Exchange, Toronto.

Spend your winter in Florida on a Cruiser-Houseboat. My 97-ft. cruiser houseboat, more properly a cruiser, is now in Florida, and I will not be able to use it until April 1st. Therefore, I will charter reliable parties for the entire winter up to April 1st, at a price usually charged for a boat of this class for one month. The main point, the parties must be thoroughly reliable. Accommodations for crew and eight guests, without using upper berths. A big "snap" to the right people. Address Yacht Owner, c/o W. A. Stock, 210 Kresge Building, Detroit, Mich.

For Sale or Charter—One 154-passenger and freight boat, speed 10 knots. 56 ft. x 16 ft. x 3 ft. 3 in., built of 2 in. planking. Two 30-40 H.P. Vulcan, 4 cyl. each. Tanked for outside waterways. Built November, 1917. I want a partner who can show the boat how to make money. Any port. One 22 ft. x 8 ft. shad skiff, 9 knots, 12 H.P. Hall, 2 cyl., built 1918. Both boats in commission. Cheap. Capt. Bender, 919 Lombard St., Wilmington, Delaware. 'Phone Wil. 3742.

Watercar 20 mile day cruiser, new this season, $950. Fast, up to the minute V-bottom runabouts and cruisers built at extremely low prices. Bronx Boat Works, foot Willow Ave., near East 132nd St., New York City.

Hunt Ducks With Live Decoys—Wild mallard stock for sale, guides and motorboats for hunters on Orange Lake at reasonable rates. For full particulars write Davis & Gist, McIntosh, Fla.

For Sale Cheap—Brand new Type A-12 Fiat and V-5 Isotta engines. Brady's Warehouse, 554 West 58th St., N. Y. C.

One cyl., two cycle	
2HP Detroit	$25.00
3HP Ferro	35.00
4HP Northwestern	55.00
5HP American	60.00
6HP Caille	65.00
8HP Fairbanks	85.00
Two cyl., two cycle	
7HP Eagle	75.00
8HP Ferro	85.00
10HP Racine	65.00
12HP Gray	125.00
15HP Emerson	115.00
20HP Gray	175.00
Two cycle	
18HP Vim 3 cyl	125.00
20HP Roberts 4 cyl	155.00
40HP Roberts 4 cyl	275.00
55HP Vim 4 cyl	275.00
Four cycle	
3HP Simplicity 1 cyl	145.00
6HP Perfection 2 cyl	55.00
12HP Kermath tractor motor (new) 4 cyl	145.00
10HP Miller 2 cyl	95.00
12HP Campbell 2 cyl	135.00
16HP Dunn 4 cyl	145.00
24HP Lambe 4 cyl	265.00
100HP Hall-Scott 4 cyl. (new)	350.00
150HP Curtis 8 cyl. (new)	
45HP Buffalo 4 cyl. 7x9 with gear	850.00

BADGER MOTOR CO.
Milwaukee, Wis.

Auto Motor Supplies—Buick—Michigan—Stoddard Dayton—Cadillac—Overland—E.M.F. Continental and Buda Motors, all types $50 each and up. Special high tension 2 and 4 cylinder Magnetos $9.50 each. Electric and Gas Head Lamps—Coils—Carburetors—Air Compressors—Generators—Starters, etc. Write for late catalogue. Address Motor Sales Dep't. B, West End, Pittsburgh, Pa.

KERMATH MOTORS—WE WILL TAKE ANY MOTOR IN TRADE ON A NEW KERMATH. GET OUR SECOND HAND LIST. KERMATH MFG. COMPANY. (Detroit, Mich.)

I have a few pair of Bausch & Lomb 6 x 30 power, prism binoculars and will sell them for about one-half of the regular price—this is a wonderful opportunity for yachtsmen to get a good pair of glasses. Percy M. Child, 1110-14th St., N.W., Washington, D. C.

For Sale: 1. 2KW Carlisle & Finch direct connected lighting plant, and 1, 5 KW Winton direct connected plant; also 1-18 in. and 1-14 in. Rushmore searchlight and one 9 in. all brass-stand deck type yacht searchlight, and a few 150 lb. mushroom anchor. Percy M. Child, 1110-14th St., N.W., Washington, D. C.

For sale cheap to clear stock—one brand new Matthews 32 volt Marine Electric Lighting Plant—Model H-20 light Full-Automatic; also one 50-light size Land type. Widger & Miller Company, 141 Milk Street, Boston, Mass.—Matthews Dealers.

For Sale—New 32-40 H.P. Red-Wing unit power plant, removable heads. This is the one bargain in a life time. First check takes it, $600. Box 3, MoToR BoatinG.

Want and For Sale

20 and 24 ft. power dorys. 20 ft. speed, 28, 25, 27 and 32 ft. cruisers for Florida waters. Thos. Fleming Day, Inc., 412 8th Ave., New York.

Hacker design 26 x 5½ ft. mahogany runabout, natural finish. Hall-Scott four cylinder, 100 H.P. motor, electric self-starter. Only used six weeks on fresh water lake. Seats six to eight comfortably. Guaranteed speed thirty miles per hour; will do better. Full equipment. Asking $3000.00. Will consider cash offer. Must sell. Cannot be duplicated for $5000.00. For full description write Jay A. Mellish, 312 Riverside Drive, New York City.

Wanted—Cruiser, between 50 ft. and 80 ft. long. Not less than 12 ft. beam. Not more than 4 ft. 6 in. draft, twin screw preferred. A strictly up-to-date cruiser desired. I will allow a fair price for this cruiser in exchange for my island home in the St. Lawrence River. My place is fully equipped with every convenience and luxury. Furnished most comfortably and has fifteen rooms, five baths, electric light and water plants. Boats and power craft. Location ideal, near golf club and yacht club. Will take mortgage back for entire difference between cost of boat and price of place. Property will be valued at cash selling price and boat will only be considered on same basis. Address Island Home, Lock Box 5, City Club, 55 West 44th St., New York City.

Position Wanted—Two steady and experienced Licensed Captain and Gas Engineer wish permanent position on boat for southern waters, will take boat down, also do repair work. Best references. Capt. Chas. Klett, 215 N. Dorset Ave., Ventnor, New Jersey.

Clearance sale of used and rebuilt motors. We are offering our large stock of marine engines ranging from 2 H.P. to 200 H.P. at real bargain prices. Also a few used reverse gears. Write for our complete list. Belle Isle Boat & Engine Co., Builders of the "Bear Cat", Detroit, Michigan.

No. 1419—For Sale.—Express runabout, built 1920, double planked mahogany, A-1 workmanship. Small cockpit forward, larger cockpit aft with controls. 200 H.P. Hall-Scott motor giving speed of 38 miles. Whole outfit in best of condition. If desired for Southern use can be easily loaded on cars. Owner building larger boat. Apply to John G. Alden, 148 State St., Boston, Mass.

THE MOTOR BOATING MARKET PLACE

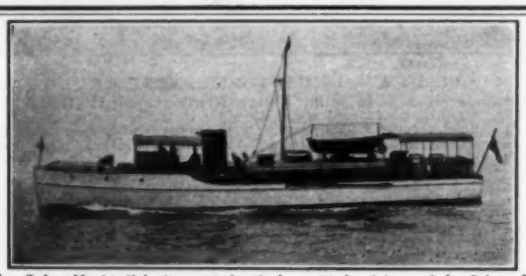
The rate for "For Sale" and "Want" advertisements is 6 cents per word, minimum $1.50. If an illustration is used, the charge is as follows, which includes the making of the cut:

Cut one inch deep, one column wide..... $ 5
Cut 1½ inches deep, 1½ column wide..... $10
Cut 2¼ inches deep, three columns wide..... $20

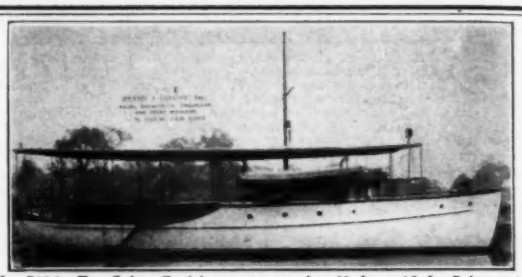
Terms: Cash with order.

Opportunities for the Motor Boatman

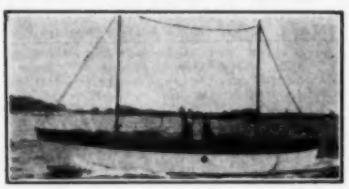
Before you buy or before you sell examine the exceptional buying and selling opportunities under this heading. They comprise the best offers of the month. Please mention MoToR BoatinG.



For Sale—Yacht Celeritus, 61 ft. O. L. x 11 ft. 6 in. x 3 ft. 9 in. Designed by Swasey. Built by Jacobs 1916. Redesigned 1919. Motors overhauled 1920. Power plant, two Sterling eight cylinders 150/200 H.P. each. New power dingey built 1920. Perfect order. Complete inventory. Price low. Apply Oliver, 417 Canal Street, New York.

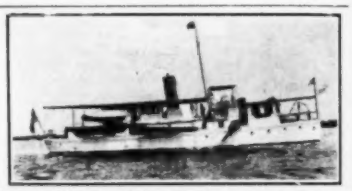


No. 7194—For Sale—Cruising power yacht, 60 ft. x 15 ft. 7 in. x 4 ft. 6 in. Speed 10 knots. Six cylinder 75 H.P. Murray & Tregurtha motor. One double and single stateroom, bathroom, galley, etc. Heated by hot water; owner anxious to sell. Henry J. Gielow, Inc., 25 W. 43rd Street, New York City.



No. 439—For Sale—Able cruiser of lifeboat type but with yacht finish. Two separate cabins with toilet, galley aft, engine under cockpit. Built 1916, very lightly used and always well kept up. Speed 10 miles. Condition excellent. Moderate price. Apply John G. Alden, 148 State St., Boston.

For Sale—Seabury built raised deck cruiser, 35 x 9 ft. Lamb motor. Accommodations for four. Electric lights throughout. Full equipment for cruising, boat in commission at Harlem Yacht Club, City Island. Price $2000. For further particulars call Westchester 639 or write to A. Wesp, Ferris Point Road, Bronx, New York City.



No. 8173—For Sale—Twin-screw steam houseboat 80 ft. x 18 ft. x 3 ft. 6 in. Four single staterooms and bathrooms. Sleeps seven. Hot and cold running water. Boiler retubed 1920, also engine overhauled. Underbody coppered to waterline. Now hauled out, and inspectable Florida. Henry J. Gielow, 25 W. 43rd Street, New York City.

REBUILT MOTORS

The Engine You Want at the Price You Want to Pay

We carry in stock inboard and outboard motors ranging from 1 to 600 H.P., of all types. These machines are honestly rebuilt in our own shops and sold with an IRON-CLAD GUARANTEE. We recently announced a reduction of 20% in the price of these engines, which brings the prices in most cases down to about 40% of Their Original Cost.

Write us for our Bargain List—it will be sent anywhere on request.

BRUNS, KIMBALL & CO.

153-155-157-159 West 15th Street New York City

We also are distributors of and carry a stock of the following NEW motors —the finest built in this country—

Sterling	Kermath	Murray & Tregurtha	Missouri
Gray-Prior	Peerless	Wolverine	Roberts
Frisbie	Arrow	Doman	

All Sizes Rebuilt Marine engines from one to 300 H.P. 4 cyl. 4 cycle GLOBE 10 x 14", reverse gear, magneto, 48" propeller, $6,000.00. Pair STANDARD 300 H.P. 12 x 14" reversible, cost $25,000.00 each, price $4,000 cash. Many other large and small four cycle and two cycle engines, for work boats, yacht, cruiser or tender. Write for list.

Hamilton Marine Engine Exchange 440 Fifty-Second St. Brooklyn, New York

COMMANDER

45 x 9 Foot All Mahogany Hacker Day Cruiser

Powered with Liberty Motor. Guaranteed speed over 35 miles per hour.

Has four berths, toilet room and galley in main cabin. Two berths forward and large cockpit aft. First class outfit in every respect. Fully equipped.

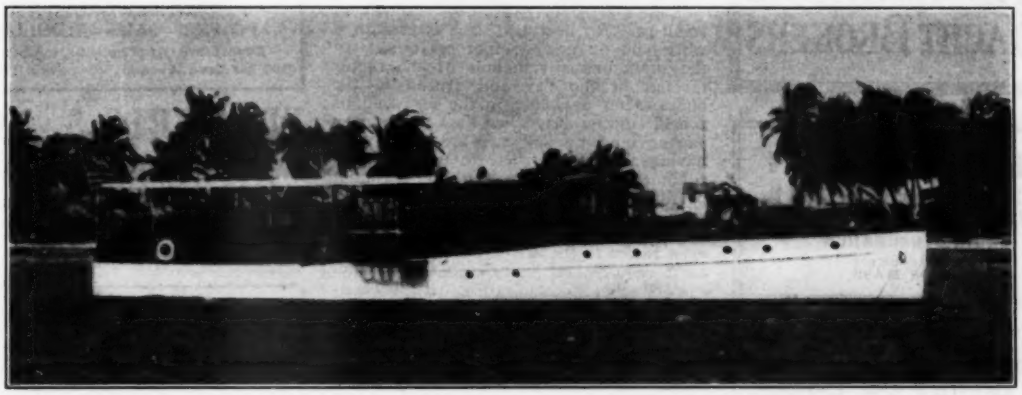
A real outfit for Florida. Can be had at an attractive price.

Write or wire for details

HACKER BOAT CO.

1525 Crane Ave. Detroit, Mich.

Advertising Index will be found on page 104



L'Apache—For Sale or Charter

ONE of the finest and most celebrated motor yachts afloat. L'Apache was built at the Seabury yards and embodies the best of everything in design, finish and equipment.

Length 72 ft. Beam 12 ft. Draft 3 ft. 6 in.

Speed 19 miles per hour

Oak keel, frames and floors. White pine decks. Double cedar planking. All other woodwork, hand rails, etc., of matched teak. Keel sheathed with copper with one inch oak strip. Watertight bulkheads.

Equipped with two 7″ x 8″ six cylinder Speedway motors. Copper fuel tanks, 700 gallons capacity. Copper water tanks, 200 gallons capacity. Deck pump. Auxiliary electric lighting plant.

Hardware fittings of Monel metal. Dining Saloon finished in teak. Finish of staterooms, toilet and bath room, mahogany, white enameled, with mahogany trim. Ceiling paneled. Hair filled cushions throughout, covered with best grade leather. Have rearranged bath room and put in ice box, sink, etc. Cedar dinghy 12 feet long with portable motor.

L'Apache is in the best of condition. Has been in charge of the same captain since the day it left the Seabury yard. Sale price includes everything ready for cruising, complete furnishings, etc., except silverware.

Price $40,000. Charter $150.00 a day. (Minimum charter 10 days.)

Inquire of your own broker, or write

J. A. ALLISON Miami Beach, Florida

A Cabin Heating Suggestion

(*Continued from page 27*)

small party of boatmen, tired after a day's work and on a 25-35-foot craft, sick of the monotonous rumbling of the motor throughout the day and frozen to the bones, after exposure to the icy wind of a cold autumn day, when they finally drop anchor in some bay and are hopeful of having a restful night in a warm cabin.

Under these circumstances one cannot possibly consider the many clever schemes, such as using the exhaust gases, or cooling water for heating purposes, nor can they even resort to the use of a kerosene stove, as it requires continual watching.

Very seldom does a cruiser have a chimney, and therefore a coal stove cannot be used. The only safe, practical and inexpensive method, in my opinion, is to follow the practice of the Belgian railroads. When it happens to be cold they put a couple of containers of hot water or sand in each compartment and the radiation of these heat reservoirs is sufficient to keep the compartment and the passengers warm for a period of 3-5 hours, after which time they are exchanged for a couple of freshly heated containers.

Let us assume that the boat's cabin is 10 feet in length. In this case we will have about 140 sq. ft. of single planking losing 1 b.t.u. per square foot per hour for each 1° F. of difference between the outside and the inside temperature and about 60 sq. ft. of double planking losing 0.5 b.t.u. per sq. ft. and about 25 sq. ft. of windows, losing 1.2 b.t.u. per sq. ft. The total loss of heat through the total surface of the cabin will therefore amount to 207 b.t.u. per hour for each 1° F. If we intend to supply enough heat for 7 hours, when the outside temperature is 32° F., and the inside temperature is 60° F., the heating bodies suggested will have to replace a total loss of $207 \times 7 \times 28 = 40{,}000$ b.t.u.

As a reservoir of heat I propose the use of concrete blocks. The specific heat of concrete is 0.27 and the specific weight is 2.5. In other words, each pound of concrete heated up to 720° F. and cooled down to 90° F. radiates $(720 \times 90) \times 0.27 = 170$ b.t.u. To supply the necessary 40,000 b.t.u. 250 pounds of concrete will be required or 4 blocks, about 60 pounds each, measuring 9 x 9 x 9 inches. Any kerosene stove that is used for cooking can be used for heating these blocks. But the best and quickest method is to use a Primus stove having 4 to 5 burners. In 30 to 40 minutes all 4 blocks will be heated properly. To hasten the heating and to prevent the loss of heat the block is insulated on 5 sides. After heating, these blocks are put in a wooden case with an insulated bottom and a few holes on the top.

J. L., New York, N. Y.

Vibration—Its Cause and Remedy

(*Continued from page 29*)

may result. More clearance is the remedy, accomplished by lowering the shaft or moving the wheel further aft. Cutting off the tips of the blades should be the last resort, then cut very little.

When the propeller is too far from the bearing, so as to allow the shaft to bend under the side thrust, vibration is set up which communicates to the boat.

A bent shaft is a common cause of vibration. To test the truth of the shaft, center it in a lathe or stretch a wire alongside it. The shaft may be tested without removing it by holding a piece of chalk so that it just touches the revolving shaft. If the result is a circle around the shaft it is true, but a true shaft might not touch all the way round due to misalignment. Truing a sprung shaft is a nice job for a good machinist and but few amateurs can accomplish satisfactory results with improvised equipment. Better take the job to the best machine shop in town.

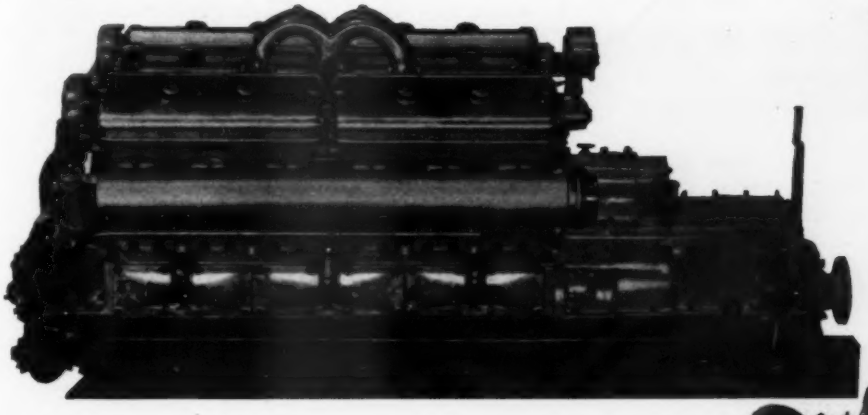
Often a long shaft will whip, causing vibration. The whipping is easily remedied by installing a spring bearing to steady the shaft. Misalignment causes undue friction as well as vibration, and should not be tolerated. In light hulls the installation of a flexible coupling can be recommended. Vibration from a motor loose in its bearings or on the foundation or on a loose engine bed has an obvious remedy.

Excessive vibration is the cause of much annoyance and inconvenience.

W. B. M., Newburgh, N. Y.

Advertising Index will be found on page 104

ALLISON MOTORS



Built for the man who can afford the best

The Highest Priced Marine Engines Built

IN producing Allison Motors we have had in mind the limited class of yachtsmen who want the finest marine power plant that can be built, regardless of cost. No attempt has been made to create an engine that can be sold at a competitive price.

The Allison Motor is priced at $25,000 and is worth every dollar of its cost when measured by the standards of absolute reliability and maximum performance. It can be compared with no other motor because no other such motor has ever been built.

This is a twelve cylinder engine of the 60 degree Vee type. The bore and stroke are 5½"x 7½", and the rating 400 h.p. at 1400 r.p.m. The weight is 4,400 pounds. To the last detail the design has been worked out and its success demonstrated in actual marine service before the appearance of this first public announcement.

Restricted production makes it desirable for those interested in such a motor to communicate with us immediately.

The Allison Motor is the result of three years of conscientious effort to produce the highest type of marine motor possible to build

ALLISON ENGINEERING COMPANY

Indianapolis, Indiana

Beating Up to Windward

(*Continued from page* 9)

old sea dog and put a reef or two in the mainsail."

The ensuing night was one of the most uncomfortable we have ever spent, for we took a cross chop from the heavy sea thrown against an almost perpendicular coast. Spray came over in barrelfuls and twice Chambers was thrown bodily from his bunk to the cabin deck. Try as we would we seemed to get no nearer to Colorados Point Light which marks the entrance to Cienfuegos Bay, for the wind shifted to frustrate every tack. Finally, at daylight, we doused all sail, started the motor, and put an end to tacking fruitlessly about.

Squibb, whom I relieved at four, helped me with these duties and then stayed on deck, one arm clinched around the mainmast, to watch the miracle of sunrise. He, more than any other man I ever knew, takes supreme delight in nature's beauties, and in the latter days of this cruise he has gone without sleep for hours on end to absorb the charm of the West Indian islands. This, our landfall at Cienfuegos, was more than usually appealing, for the sun arose tardily behind the lofty mountains of the Trinidad range, sending before it streaks of crimson and flashes of silver that illumined wind-torn cirrus or brought into sudden roseate prominence some upstanding mountain of cumulus. Near us the sea broke savagely on an outlying reef, but between the capes guarding the entrance to Cienfuegos Bay we caught a glimpse of the peace and security that was to be ours after six days at sea.

Under power we passed by Colorados Point and then, finding a favorable slant of wind, set all sail. At the moment of passing the station pilot ship we broke our ensign to the breeze, and from the corners of our eyes, watched the antics aboard that craft. With the energy characteristic of a certain element of humanity when an American dollar is seen to be slipping away, the pilots hallooed and waved and jumped in the air. We could not understand the words and we feigned blindness as well as deafness, but I could imagine some such monologue as this issuing from every pilot's throat:

"Carramba! An American yacht entering the bay without a pilot! Stingy New York millionaires unwilling to pay us what is due us! May bad luck overtake them and the nearest reef wreck them."

But we entered the broad and beautiful bay without mishap and by seven o'clock were anchored off the city ready to receive customs and quarantine inspectors. They came out in small motor boats, courteously put us through the formalities, and by nine we were on dry land voraciously surrounding eggs and coffee.

We had intended remaining at the City of a Hundred Fires only long enough to take on food and water and to obtain a full night's sleep, but we had not reckoned on the delightful hospitality of T. W. Bibb, clerk of the American Consulate. When Chambers met him and Mrs. Bibb at the Consulate, and they learned that we were the crew of the diminutive Hippocampus, nothing but Al's promise to stay another day and partake of regular American cooking would satisfy them. First of all, however, we must agree to accompany the Bibbs to the Cienfuegos Yacht Club and swim with them in the shark-proof enclosure.

Al, returning aboard, found all hands as enthusiastic as himself, and on the following morning we arose at six—something of a wrench the second day in port—picked up our hosts at a wharf and stood down the bay to the yacht club. A bay as magnificent as that of Cienfuegos if situated anywhere along the American coast would be literally dotted with sail and motor craft. Located in Cuba as it is, enjoyment of aquatic sport is hampered by the high cost of boats and gasoline; but it speaks well for the energy and sportsmanship of the Cienfuegans that they have a yacht club as fine as that of Havana. There are many high-speed motor boats in the bay, and the art of rowing is practiced, although, according to the explosive Titus, American rowing coach of the club, not yet perfected.

For an hour or so we swam in the shark-proof stockade—a most necessary feature of a bathing beach in these waters—and then breakfasted aboard, Mrs. Bibb presiding in the galley. Never was a day more auspiciously begun, and, since leaving the States at least, never more satisfactorily ended, for that evening we dined at the Bibbs' picturesque villa in the suburbs of Cienfuegos and knew again the delights of home society and cooking.

Come to think of it, the day was pretty satisfactory altogether, for we met various officials of the Ward line who manifested a lively interest in our craft and showed us how to purchase stores at the lowest figure; and with one of them, Octavio Echemendia, we lunched at the Union Hotel. By him we were introduced to his uncle the mayor. Alvero Suera, mayor of Cienfuegos, with whom we had a private audience at his home, is an energetic, upright public servant of the type that is conspicuously lacking in Cuban politics. If there were more like him in insular affairs there would be greater prosperity in Cuba and less cause for apprehension in Washington.

(*Continued on page* 54)

Advertising Index will be found on page 104

GALLEY KOOK KIT
TRADE MARK

For your new boat

Gar Wood says:

"Your stove is giving perfect satisfaction and is the best I ever used. Will use one on my new cruiser Gar Junior III now building."

NOTE:

Auto Galley Kook Kit can also be had with one gallon tank and smaller pump, if desired. Other equipment is the same.

Price complete $27.50

For those wanting a more compact unit, Auto Galley Kook Kit is made with a small two quart tank attached to the end of the stove. Other equipment is the same.

Price complete $20.00

Auto Galley Kook Kit can be finished in rich black or dark brown enamel over galvanized iron, if desired, at an additional charge of 50c.

Special stoves made to order with any number of burners. Send a blue print of your galley and we will gladly submit an estimate.

Made by the makers of the famous

KAMP KOOK KITS

A PRACTICAL and efficient galley stove, especially designed for fresh and salt water craft.

Built at the request of well known boat builders, and in accordance with the ideas of several prominent motor boat owners. A galley stove perfect in every detail.

Burns motor gasoline—same grade you use in your engine—gives a steady hot blue flame that a thirty mile wind will not blow out.

Auto Galley Kook Kit measures 20¼" x 10½" x 5⅛"; legs are 2" high; body made of heavy galvanized iron strongly riveted; all fittings are galvanized or of copper or brass; gasoline tank is separate from stove—furnished with 15 feet of copper tubing so it can be mounted on deck, if desired. Tank made of heavy galvanized iron, riveted and soldered inside; brass and copper fittings; capacity 3 gallons. Pump is polished brass, 1¼" x 20".

Each stove furnished with a full sheet of heavy galvanized iron for use as a covering for the bench or table on which stove is to be mounted. This is slotted to receive stove legs, making it unnecessary to screw legs to the table.

Price complete with all equipment.....**$35.00**

Specify Auto Galley Kook Kit on your new boat. Write or wire to-day for details.

PRENTISS-WABERS STOVE CO.

General Offices and Factory
108 Spring St., Wisconsin Rapids, Wis., U. S. A.

Export Department
1416 Broadway, New York City, U. S. A.

Beating Up to Windward

(*Continued from page 52*)

In midafternoon of the day following, being provided with copies of the local newspaper which spoke of our reception by the mayor and in extravagant Spanish extolled the "heroism" of Hippocampus' crew, the able little yawl resumed her travels. Under sail she stood down the bay until she had brought us to the narrows, where, in the shadow of Jagua Castle, built generations ago as a defense against the Jamaican buccaneers, she let go anchor.

We rowed ashore in the waning daylight to inspect the disused castle, returned to shift anchorage for the night, and then, at ten-thirty, suddenly determined to get under way and take advantage of a northerly slant of air. Drifting lazily down the narrows, our canvas just filling, we showed our heels to a native fishing schooner and felt again the heave of the open sea. Then, rounding Colorados Point, we laid a course for Cape Cruz and resumed the regular watch order.

I went on shortly after midnight to find the descending moon picking out the peaks of the Trinidad range and to revel in the novelty of a fair wind and a smooth sea. But in twenty minutes conditions had changed and we were bucking close-hauled into a rapidly rising chop. The wind had come down from the mountains, unheralded by clouds, and in another hour it was blowing with the full vigor of the trade. Though we buried our nose deep in the sea and had to luff occasionally to spill the air from the sails we held on, and by eight of the morning watch had put fifty miles between us and our point of departure. This, for Hippocampus, was traveling.

At Cienfuegos we had been told that the atmosphere gave every promise of an approaching hurricane, early in the season as it was; but, since leaving that city we had been conscious of a change in conditions. The clouds were more orthodox, the sunsets better, the calms fewer, and the direction of the wind more constant. As to its strength, there was no kick coming.

We took the precaution on the first afternoon out from port to put a reef in the mainsail—the first since leaving home—and the watch below slept more peacefully as a result. But in midmorning of the next day when the trade really began to blow we doused the mainsail altogether and until late afternoon proceeded easily under jib, jigger, and a trisail improvised from our storm jib. That evening during a period of calm which was not duplicated on the remainder of the run, we double-reefed; and yet logged six knots in the early morning hours. In the forenoon, having a more moderate breeze, we shook out first one reef and then the other, but we have not since started a night without reefing down.

Midway of this voyage we again changed our plans and decided against proceeding direct to Kingston. Although we were adding greatly to our mileage with each passing hour, our distance was not by any means made good, and it was not until daylight of the morning of the fourth day that Al sighted and brought abeam Cape Cruz Light, 200 miles from Cienfuegos. So we decided to make Port Antonio, Jamaica, our next objective.

Late that afternoon, when we sighted the precipitous island and knew ourselves to be within the influence of a contrary current, a breeze came, like a gift from the gods, and blew us due east for four hours. Then, as it shifted to eastward, we changed our course to SSE, hoping against hope that when we again sighted Jamaica we would be within striking distance of Port Antonio. But—at first we refused to credit it—we made our morning landfall on Point Galina, thirty-five miles to westward.

Hitherto I have not dwelt greatly on the difficulties of small-boat navigation or done more than intimate that dead reckoning positions are often rendered unscientific by the element of hope. But the editor has asked me to be specific, to include in my story the working of a sight for the sharks among his readers to pick to pieces, and I feel that the moment cannot longer be postponed.

But first let me give a picture of navigating Hippocampus as it is done, say, on the morning of sighting Galina Point. We are sailing close to the wind on the port tack, under reefed mainsail, a heavy sea rolling and the spray flying so incessantly that the main cabin hatch is kept partly closed. I inform the helmsman, who happens to be Joe Squibb, that I am about to take a sight and hand him paper, pencil, and watch. This timepiece is not of great value and I have no hesitancy about stopping it, finger on the secondhand, to make it conform exactly with chronometer time. This, a lazy man's trick, eliminates "C-W" from my calculations and so reduces the chances of error. After taking my sights I again compared the watch with the chronometer.

Gingerly taking up the handsome Brandis sextant that was given me at the outset of the cruise, I call to Joe that I am ready and he changes course to run partially with the wind and keep the spray down. Then I crawl to the cabin house on one hand and my knees and, standing upright, brace myself against the mast. The little ship tosses so violently that it takes minutes to bring the sun down to the horizon, but at length the trick is done and I call "Mark" to the helmsman. He records the time

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Mr. H. B. Greening

Owner of *Rainbow* and *Rainbow II*. Has been working for many years on the scientific development of motor boats. He is one of the most practised and best informed of boatmen, and may be said to be the foremost amateur racing boat owner and driver of the world. Mr. Greening wrote the following letter to Mr. Walter B. Ramsay of Montreal, in response to inquiries of Mr. Ramsay's asking for his full opinion of the Sea Sled. Mr. Greening has permitted us to publish this letter in full:—

Walter B. Ramsay, Esq.,
President, A. Ramsay & Son Co.,
Montreal, Que.

Dear Walter:—

In your letter of September 21st you asked me, after our experience this summer, to give you my further impressions of Hickman's Sea Sled.

First I will repeat the substance of what I said in my letter to you of April 8th.

Hickman has invented a type of boat that is more seaworthy and will carry more load, and at the same time is much faster and more efficient than anything in the world that I know of.

I have not been anxious to acknowledge these facts because I have been a strong supporter of the V-bottom or round bottom boat.

Hickman has in his hands a marvellous creation.

My Boat "Rainbow" which I have lately sold, according to competent European and American critics, is the finest boat of her type that has been built and when I owned her held the world's record of 41.8 miles per hour. She has since increased it to 44.02 miles per hour officially. This constitutes a record for any type displacement boat powered with one marine engine. Her weight is about 18 pounds per H.P., including crew of two. She will carry five people in ordinary water, but not where it is rough. Bearing in mind that it is a question of weight per H.P. that up to the present time has absolutely determined miles per hour, along comes Hickman with a craft weighing 26 pounds per H.P. and capable of carrying from 20 to 25 men, in water that the "Rainbow" could not live in for one minute. He can run through weeds, shallow water and so forth, where the entire underworks of the "Rainbow" would be swept off.

I refer to the Sea Sled "Orlo II" which had a speed of 47 m.p.h., with a quarter more weight per H.P. than my boat.

He took me out into the Atlantic Ocean well into the Gulf Stream, and ran her full speed with twelve aboard. Our mechanicians on the "Rainbow" were trying to coax her out of the harbour, but we had to return owing to rough water.

After we came back from Florida I got Prof. George Crouch to design a boat for me for the "Fisher Trophy" race in Buffalo that would incorporate Hickman's surface propeller drive. While admitting the superior seaworthiness and weight carrying ability of the Sea Sled, both Crouch and I felt that the great speed resulted from the use of surface propellers. We had to have a boat that would turn quickly for the "Fisher Trophy" course, and the Sea Sled hull of the type to make quick racing turns had not been developed.

The new boat was named "Rainbow II". Hickman licensed us to use surface propellers and they were placed in a tunnel well forward of the rudders. We wanted great turning ability and got it. While conforming with the "Fisher Trophy" rules, the boat was practically a step hydroplane. She developed a speed of about 52 m.p.h. miles better than the screw propeller boats of similar weight.

At the Buffalo Races Hickman appeared with the Sea Sled "Orlo III". She had about the same relation of power to weight as either of the "Rainbows" but she made an official speed of 57.8 m.p.h., five or six miles faster than "Rainbow II". With our throttles wide open in "Rainbow II", "Orlo" would run away from us at the speed of an ordinary launch. To my mind this settled the efficiency question in favor of the Sea Sled form of hull.

I have talked with Hickman on this subject and if his explanation of the way the bottom of the Sea Sled hull is kept free from adhesion of the water is correct, as it appears to be, it seems probable that in none of the older forms of boat where water is thrown out at the sides, can we hope to approach the efficiency of the Sea Sled.

In Buffalo the Sled ran smoothly and without pounding in a heavy chop where the other boats were badly handicapped.

Now Walter, I always try to keep an open mind on these subjects so that I do not have to fight the inevitable, and after the closest observation extending over some years, I will say that the Sea Sled idea combined with surface propellers is the most efficient thing ever evolved. Hickman, has, at one stroke, turned things all topsy-turvy in the motor boat world.

Yours sincerely,
(signed) H. B. GREENING.

Beating Up to Windward

(*Continued from page* 54)

and I read him the angle. Two other sights are marked, preferably at equal intervals of time, and then, crawling back to the companionway, I descend, pausing in its comparative security to ascertain the index error of the sextant.

The three sights are compared and if the alteration of the sun's angle is logical—so many seconds of arc for seconds of time—I proceed to work the one which seemed at the moment of taking to be the most accurate. They are never averaged, and if the progression does not seem logical they are discarded and new sights taken. The patent log is read, and from that and a glance at the courses and distance made since the last fix, a D.R. position is assumed.

This D.R. position, as everyone knows who is familiar with the St. Hilaire system of navigation, does not have to be accurate. A navigator, turned loose in the middle of the ocean, not knowing his position within a thousand miles, could, by using the St. Hilaire method, determine his exact fix in two sights.

On the morning in question, being about ten miles offshore, I assumed that we were in Lat. 18° 25′ N., Long. 76° 36′ W., one mile to eastward of a straight line drawn between Cape Cruz and Port Antonio. Our good easterly run on the night previous I had balanced against leeway and head current, but the fix showed that we actually were twenty-five miles WNW of our course. The discrepancy must be ascribed to the difficulty of holding a small boat on her course, to sailing close into a wind that veers imperceptibly to one's disadvantage, and to the human equation—which includes poor D.R. judgment.

Here is the sight exactly as it was worked, with its shortcuts, mental interpolations of fractional parts, abbreviations, and all its crudities.

July 21, '21. A. M. Sight

CT	1-36-03	Obs. alt. ☉	42-29-30	North of Jamaica
CC+	16-34	IC-	40	Pos. by D.R.
GMT	1-52-37	Corr.+	12-15	Lat. 18° 25′ N.
EqT-	6-10.6	h	42-41-05	Long. 76° 36′ W.
GAT	1-46-26.4			H.E. 8 ft.
LoW-	5-06-24			Dec. 20-31-27 N.
LAT	20-40-02.4			

t	3-19-57.6	log hav	9.25173	
L	18-25	" cos	9.97717	
d	20-31-27	" "	9.97152	
		" hav	9.20042	8:30 A. M.
		nat "	.15865	Z 78° 30′.
D-L	2-06-27	" "	.00034	Line runs 168° 30′.
				P.l.r. 26½.
z	46-59-52	" "	.15899	Brandis Sextant
Cal. h	43-00-08			
Obs. h	42-41-05			
Int	19-03-away			

FIX { Lat. 18° 36′ N. / Long. 76° 50′ W.

This, as will be recognized, is a sight worked according to the Cosine-haversine formula of the St. Hilaire method. Two sights taken at different times, or at the same time of different celestial objects are necessary for obtaining a fix, but in this instance our latitude was known by our distance from shore, and the single Sumner line located our position.

In the accompanying detail of a chart of Jamaica it is interesting to note that the nineteen-mile intercept, or altitude-difference, when carried away from the sun on the true azimuth 78½ degrees, cuts dry land. However, the perpendicular to the azimuth, or the Sumner line, somewhere along which the ship was positioned at the moment of taking the sight, extends into deep water.

During the succeeding hours of beating against a boisterous trade wind whose accompanying billows almost lost us to sight between crests we had only the minor satisfaction of noting that as we approached the shore on the port tack the wind hauled to northward and permitted us to skirt the beach at a slowly converging angle. As we beat outward on the starboard tack the wind veered correspondingly to southward, thus permitting us to make easting on each tack. Yet, so tedious is the process of beating into a wind almost directly contrary to the desired course, it took us until daylight of the next morning to come abreast of Port Antonio Light, thirty-five miles eastward of Galina Point.

Then, bowling in with the wind more than a little abaft the beam, we observed a curious trick of the air currents. One instant we were sailing free and the next we had encountered a land breeze that took our sails aback. There being none of the

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Beating Up to Windward

(*Continued from page* 58)

customary interval between shifts in which the air is stagnant, it seemed as if the wind were suddenly determined to keep us at sea. But we have a trump card that takes all tricks, and it wasn't long before we were motoring in, sails furled.

Port Antonio, dominated by Blue Mountain Peak which rises 7,400 feet into the air, and encircled by incredible hills that seem to be out of drawing in both their steepness and contour, was a sight at sunrise even more gracious than Cienfuegos. Joe Squibb again kept the deck with me, reveling in the beauty of the tropical foliage and the absolute perfection of the land-locked harbor, his occasional world of appreciation soon seconded by Joe Chambers who came on deck in time to help us select our anchorage.

Before the hour of six, C. H. Vidal-Hall, port collector, rowed out to inspect our papers and welcome us to Jamaica, and before the sun was very high we had been visited by half the whites and all the blacks in the vicinity of the port. Of the latter, one who was more than usually gifted in the choice of words, presented us with a dozen grapefruit, and we were relieved that, despite the difference in color, we were able to thank him in a common language.

Over and above the natural attractions of Jamaica which will probably be mentioned in a later article, it has an advantage that is almost immeasurable; its inhabitants all understand the English language. Having long since despaired of making of myself a linguist I placed my faith in Joe Squibb while we were in Cuba, and hoped through him to obtain the simple necessities of cruising life. But since an experience that he had in Cienfuegos I have decided that we are all better off in English-speaking countries.

He entered a store, dictionary in hand, and paused in the doorway to learn that the Spanish equivalent of eggs is *huevos*. This word and no other he uttered, slowly and distinctly to the Cuban storekeeper, and that worthy, assuming a blank and non-comprehending expression replied, "I no spik English."

Of course, after Joe had described in the sign language what an egg is and how it is eaten fried, he was successful in securing the material for our breakfast, but I have not had the same faith in him since. Better for us to fatten up for a time on the grapefruit, bananas, and the other staples which the kindly Jamaicans have given us.

Building High Grade Motors

(*Continued from page* 24)

then prepared. Upper and lower crank-case halves are bolted together and the facing of the two halves takes place in the same operation. This insures absolute accuracy which is very important as correct alignment cannot be secured if the work is done on the parts as separate operations.

There are very many operations required to finish the pistons which are made of a special aluminum alloy. The order of these is determined in advance and the first of them is to finish off the skirt of the piston and bore the open end. On being reversed in the lathe the piston head is rough-turned and faced. The hole for the wrist pin is drilled in a box-jig which is also used for reaming it later. These holes are then used to hold the piston while the inside surface of the wrist pin boss is faced. A final finishing operation is the grinding in an accurate grinding machine after which the piston is moved to the assembly department to await its turn in becoming part of a Hall-Scott marine motor.

The connecting rod is one of the very essential parts of every motor. The practice in this plant is to machine the rods all over which is a departure from conventional methods. Among the first operations, the sides of the large end are milled while the rod lies horizontally in a milling machine being held firmly in place by a special clamp and straps. The holes in both the large and small ends are drilled in two rods at the same time on the same machine. An improvement is under way whereby the machine will drill two holes and then ream two holes instead of the present method. One operator handles three machines while the holes are being drilled. The first machine mills the bolt bosses lengthwise and the next one mills them true to length from top to bottom. The time required for these operations is seven minutes or at the rate of sixteen rods per hour, these being worked in pairs. The outside of the rod is finished. The channel in it is first rough cut and then finished on a finishing machine while the rod is held securely on short studs. The weight of the rods can be governed by the material removed from the channel and the machine is so adjusted that the same size of cut is made on each rod which secures uniformity of weight. A multiple spindle drill makes the bolt holes in the big end of the rod in one operation. Before the rods are assembled into the finished machine they undergo a very rigid inspection to determine their weight and whether the holes in both ends are absolutely parallel and true and that no distortion exists.

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Advertising Index will be found on page 104

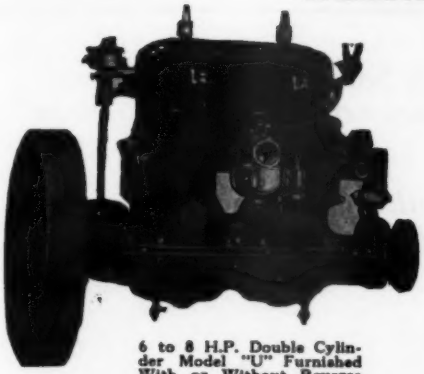
Gray Marine Motors for 1921

"the engine with the Big crank shaft"

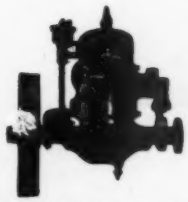
NEW PRICE $550.00

10 to 25 H. P.

New "V-M" 4-cycle valve-in-head motor furnished with Bosch Magneto with Impulse Starter—no batteries required — also furnished with Electric Starter.



6 to 8 H.P. Double Cylinder Model "U" Furnished With or Without Reverse Gear



Selected for Canoes, Row Boats and Small Launches. 3-8 H.P. 2-cycle Gray Motor. Standard the World Over.

Your DEPENDABLE Power Plant for Work Boat, Cruiser or Runabout.

The New York State Barge Canal tried out 4 model "V-M" Gray Motors in 1919 with other leading makes. Last year they put in commission 35 more Grays.

OVERHEAD valve marine-motors are acknowledged to be of greater efficiency and power than other types and in the Gray the ultimate of valve-in-head marine motor perfection has been attained.

The Gray is designed to operate on either gasoline or kerosene, it cannot backfire, it burns the fuel keenly with practically no carbon, soot, smoke or odor and lubrication troubles are unheard of in the Gray.

Our Hot-Spot Cylinder Head gasifies thoroughly the fuel used and renders it completely combustible.

Gray Two-Cycle Motors are built in models from 3 to 8 h. p. Gray Four-Cycle Motors are built in three sizes, 10 to 50 h. p. Write for FREE literature.

Leading Boat Builders for upwards of 15 years have specified Gray Engines as standard equipment for their boats.

GRAY MOTOR COMPANY 2106 MACK AVE., **Detroit, Mich.**

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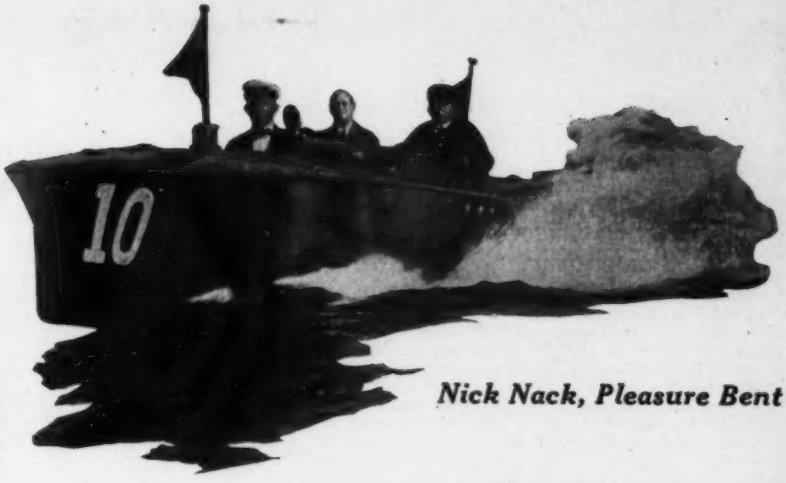
World's Records Smashed!



Nick Nack, Pleasure Bent

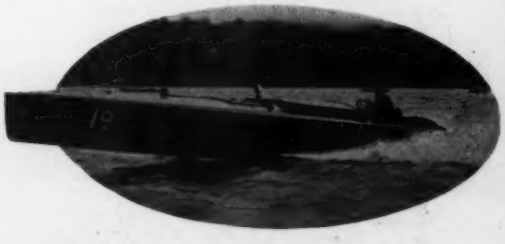
NICK NACK, owned by Vice Commodore Humphrey Birge of the Buffalo Launch Club, in the Wood-Fisher Trophy race at Detroit, Aug. 27th, 29th and 30th, 1921, **created three new World's records** for displacement runabouts powered with Marine Engines. A fourth World's record was made at Toronto, Sept. 6th.

NICK NACK is a 32' x 6'3" displacement runabout, thought out and produced by Hacker Boat Co. of Detroit. Power is a 6 cylinder 5" x 7" 200 H.P. HALL-SCOTT STOCK MARINE ENGINE. (824 cubic inches piston displacement.) This boat will comfortably seat seven people.

NICK NACK was entered in the Fisher-Allison race at Buffalo, but was not completed in time to compete. Commodore Birge then entered NICK NACK in the Wood-Fisher race, which is run under an almost duplicate Deed of Gift and same Rules; against boats powered with 12 cylinder 400 and 500 H.P. motors and finished second —establishing the following records:

	M.P.H.
Lap Record..2½ Miles	**42.15**
Former Record.....	41.6
Heat Record..50 Miles	**41.3**
Former Record.....	39.8
Race Record.150 Miles	**40.6**
Former Record.....	38.3
Lap Record....5 Miles	**42.856**

Nick Nack, Racing



Previous records were made Aug. 11-12-13, 1921, in the Fisher-Allison race at Buffalo. Lap record 5 miles 42.856 M. P. H. Made at Toronto—Sept. 6, 1921.

HALL-SCOTT Marine Engines, since their introduction in the Marine field, have been breaking records for uninterrupted operation at all speeds in Runabouts and fast Cruisers. Their performance has proven conclusively that motors properly designed—parts accurately machined and balanced—engines properly assembled and tested, outlive and function better, with fewer mishaps, than the Marine Engine with superfluous weight, inferior materials and workmanship. Ask any HALL-SCOTT owner.

BUILT IN TWO SIZES ONLY

4 cylinder 125 H.P. Weight 1100 lbs.
6 cylinder 200 H.P. Weight 1300 lbs.

Single and Twin Screw Plants in Stock at

HALL-SCOTT MOTOR CAR COMPANY, Inc.

Eastern Sales and Service Branch, 266 Main St., Buffalo, N. Y.

Factory—Berkeley, Calif.

Yard and Shop

(Continued from page 40)

Kermath's Power Carried Namid to Victory

Namid won the Time Prize in the Scripp's Reliability Long Distance Classic from Rocky River to Put-In-Bay, making the fastest time that has ever been made in any Scripp's Trophy Race because of the endurance of her 40 h.p. Kermath engine.

To Repair Canvas Canoes

The method of applying Jefferey's Special Marine Canoe Glue to a cut in a canvas canoe is as follows. The glue is melted until it is about the consistency of thick paint. Turn back the edges of the cut and paint the glue in the wood about an inch back all around the cut, then lay the canvas back over the glue and iron with a hot flat iron.

If the edges are badly frayed or far apart, and if it is a bad tear, paint on another coat of glue and lay over this a piece of canvas, cotton or silk about an inch larger than the tear, then iron with a hot flat iron. After this is done give it a heavy coat of shellac and paint any desired color.

Fire Damage Small

A disastrous fire in the Long Island City plant of the Astoria Mahogany Company not long ago destroyed considerable quantities of veneer probably not exceeding three million feet of mahogany, circassian walnut and other veneers. The tremendous stocks of mahogany and other valuable woods in the lumber yards were not touched by the fire and in consequence the business will not be interfered with in the least. Tremendous large stocks of mahogany lumber and mahogany veneer of all kinds are on hand and all orders will be promptly filled.

Factory Branches Established

The Clark-Turner Piston Company has announced the establishment of factory branches at important distributing centers in the United States. The Deluxe Light Weight Gray Iron Pistons will be stocked at points so that any part of the United States can be served in 24 hours or less on any size or over size of pistons desired. The New York branch will be the Westervelt Machine Corp., 921 Eighth Ave.

Mogul Bearings in Nick Nack's Hall-Scott Engine

Nick Nack, which scored three new world records for runabouts with marine engines, was equipped with a six-cylinder Hall-Scott engine. As usual, the Hall-Scott engine was furnished with Mogul Motor Bearings, which acted perfectly throughout the hard race.

Some Characteristics in the New Elto

The Elto Outboard Motor Company claims that it has succeeded in bringing about vibrationless operation in its new Elto Light Twin Outboard Motor by means of a sturdy twin-cylinder construction. The motor is silenced almost entirely by a new underwater exhaust principle.

Consolidated's New Fishing Model

The Consolidated Shipbuilding Corporation recently announced the completion of its new 1922 model fishing boat which is equipped with a six-cylinder, 66 h.p. Speedway motor.

Nelseco Diesel Engines

The New London Ship & Engine Company's 120 h.p. Nelseco Diesel engine drives the 84-foot yacht Idealia, the first American Diesel powered yacht, at 14¼ miles per hour, using only six gallons of fuel oil at approximately one-tenth the cost that fifteen gallons of gasoline would amout to in order to produce the same power.

The Number of Gray Motors Increased on New York State Barge Canal

In 1919 when the New York State Barge Canal experimented on the adaptability of some of the leading makes of marine motors for its service it chose four Model "V-M" 4-cycle valve-in-head Gray motors. Last year it put into commission 35 more Grays. The Gray motor is constructed to consume either gasoline or kerosene.

(Continued on page 86)

Building High Grade Motors

(Continued from page 60)

Among the most important details in connection with the building of high grade motors is the testing of the crank-shaft. This is a very elaborate process it being necessary to check the lengths very precisely and also to determine the relation between each crank throw and its neighbor. The diameters of the shaft, bearings, and crankpins are very carefully gaged by snap gages and micrometer measurements.

Similar careful workmanship is also required on the camshaft. The requirements for precision in this part of the machine are even more rigid if possible than the other parts. On the accuracy of the cams depends the correct functioning of the valves. The slightest inaccuracy will show in poor running of the motor; this is particularly so in the case of high speed machines.

Many of the secondary parts, which have not been referred to, require as intricate processes of manufacture. There are many sundries such as valves, piston rings, bolts, and numerous other articles which enter into the completion of the motor which are just as carefully inspected and examined as the major parts of larger size. All these many items finally come together in the assembly department where the motors rapidly take shape under the skillful hands of the mechanics. A trunnion fixture carries the motor base in the assembly room in such a way that it is possible to turn it in any desired position with a minimum of effort so that the utmost freedom is allowed the assembler. After the completion of the motor it is thoroughly tested under its own power and in connection with a Sprague dynamometer which shows up the power which the motor is able to develop in great detail. If the motor fails to pass the test it is rejected and the fault remedied. All motors are disassembled after the test and minutely examined for any possible defects in material or workmanship. They are then reassembled and run again so that when they finally reach the purchaser there is no question but what they will run under their own power without any need for adjustment or trials of any kind. Numerous instances are known where these motors have been installed in boats and have performed satisfactorily on long initial trips without previous operation.

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CONTROLLED

with the

JONES

Hall-Scott standardize on Jones Tachometers.
Baby Gar
Miss Chicago
Miss America II
Nick Nack
N-C Planes that made the Transatlantic flight standardized on the Jones.
Duesenberg Car—winner of the Paris Grand Prix.
Japanese Navy—standard equipment.
United States Army and Navy Aeroplanes.
United States Navy Submarines.

Distinguishing Features of the Jones

1. Extreme lightness and high speed of the governor system (4 times the speed of the driving shaft).
2. A uniform scale of greater length and openness than has yet been attempted with centrifugal instruments.
3. All main operating parts operate on ball bearings.
4. The gears enabling the instrument to be driven at cam shaft speed are embodied in the instrument itself.

Wherever extreme accuracy, reliability and durability are required, you will invariably find the Jones.

CONSOLIDATED INSTRUMENT COMPANY
OF AMERICA
461 Eighth Avenue New York, N. Y
Chicago Detroit Cincinnati San Francisco

Miss America II—Controlled with the Jones

The JONES TACHOMETER

Advertising Index will be found on page 104

The By-Ways of Florida

(*Continued from page* 16)

lovely cypress, or group of trees, greet the eye constantly. It finally becomes so narrow and winding that it is with great difficulty that you can proceed at all, so, if you have thought to tow a canoe, as we did, you have to tie the launch to a tree, and paddle the rest of the way. "The rest of the way"? We never reached any "end," for we got to a place that was only about ten feet wide, and several branches of equal width led off into the forest, and we were afraid we might be lost if we went "the rest of the way," so turned around and paddled back. We saw no alligators, but we heard them barking from their hidden haunts, and we had to continually watch overhead for fear the deadly water moccasin would drop off the branches which met overhead, into the boat, which you occasionally hear of their doing. There is never a second that you are not in the centre of the most beautiful picture, but it will be difficult for you to grasp the beauty of it without having known its quiet and seen its coloring and infinite variety. We caught several big-mouthed bass up here, one weighing over three pounds, and we lost two good hooks on big ones that we were unprepared for.

If you go up the first, afore mentioned, right-hand branch of the river, you get very different scenery; very interesting because it takes you into the Everglades, but no trees to speak of, only saw grass on either hand as far as you can see. We caught several bass up here too, when we explored it, and the fishing is probably equally good both places, and it is equally wild, though so absolutely different in character. At any rate, if one is fond of beauty, and who is not?—one has not seen one of the beauties of the South if he has passed this river by. Another river of good depth and real beauty is New River at Fort Lauderdale, north of Miami about twenty-eight miles. You enter the river just South of New River inlet, and very quickly come upon an interesting landmark, the place where a farmer named Cooley, and his family of five, lived and were massacred by the Indians in days long past, days of the troublous Indians. There is still a marked clearing, and the remains of a house can still be seen, though vines and underbrush climb over its foundation. Passing by, you are in the midst of a rapidly growing settlement where, not so many years ago, was only one house, or store, to which the Indians used to come to trade otter and other pelts, for the necessities of life. Sea walls, all the way, on both sides, and attractive homes built and in the process of building, and then Fort Lauderdale's business centre, a very active place indeed. We tied up to the Visitors dock and waited until after lunch to explore the upper and wilder part of New River. Up this we went in the launch, to the very end, or rather until the river becomes a canal cut leading into the canal proper, which in turn goes out into the Everglades. Up to the time of striking the canal cut, possibly ten miles, we were continually met by most beautiful scenery.

There are still many Seminole Indians living in the Everglades back of Fort Lauderdale, and on the outskirts of the town, and also in the river, is an Indian village of palmetto leaf shacks, in which the Indians live when they come into town to trade. This we passed, and it was very interesting.

When we reached the canal, we climbed out onto the high clay bank, and from its top, we could see the saw grass of the Everglades stretching out in all directions for miles, occasional bunches of trees standing out brilliant green against the burnt looking, waving field. Turning homeward we put out the ever present fish rods, and were rewarded by catching several sargent fish; we had hoped for bass or tarpon, and while we saw a few of the latter, we had no strikes.

I wonder how many yachtsmen, when down the Keys, have anchored in Tarpon Basin and explored the beautiful little streams on either hand just before entering, going South. A canoe is the best vehicle, as both are very narrow and very winding with the eastern one the most interesting. Mangroves grow thick on each side and meet overhead, and the water is very deep and very mysterious, and occasional glimpses can be had of grouper and snapper dashing off from their positions under the roots of the friendly trees. Suddenly the eastern stream rounds a sharp bend and you have to low bridge to get under a network arch of mangrove branches, and then you come out quite unexpectedly into an enchanting little pond, if you would call it that. This pond, whose banks are covered with a profusion of mangrove trees, very tall, is almost circular, and the water very deep; and the bottom, which you can see clearly is literally covered with sponge growths of a peculiar cone shape, growing point down into the mud. One of these we tried to dig up with a boat hook, but it resisted all of our efforts, and we had to give it up. We did not see a single fish in here, but the bottom was so interesting with its other life, that we had no regrets.

Have no doubt that these are only a very few of the really fascinating Byways of Florida water travel. But certainly it is when you get off the beaten track that you come upon the really loveliest bits of Florida.

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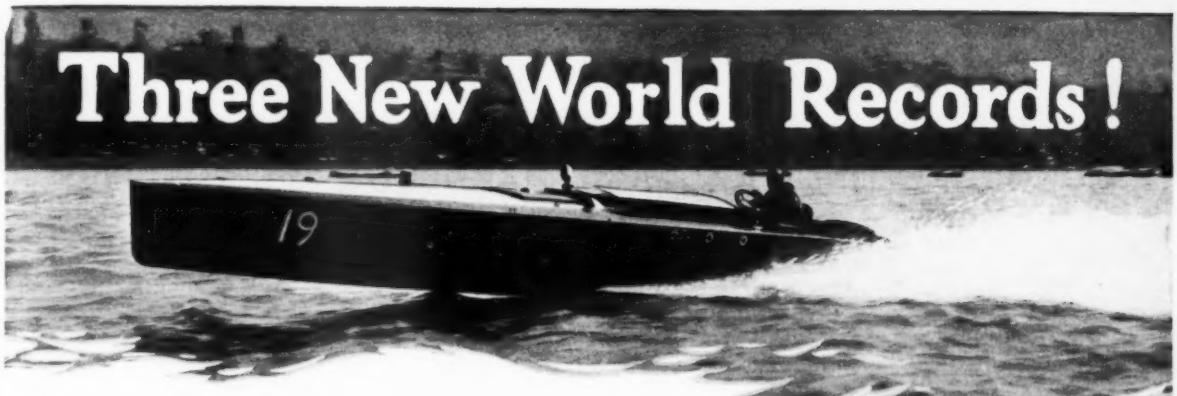
Three New World Records!



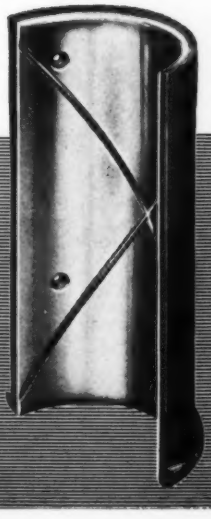
The Nick Nack, powered with a six cylinder, 200 H.P., Hall-Scott engine, smashed three world records for runabouts with marine engines, in the Wood-Fischer race at Detroit, August 27-30. The three new world records are: lap or 2½ miles at speed of 42.15 M.P.H.; 50 miles in 1 hour, 12 minutes, and 31 seconds—average of 41.3 M.P.H.; 150 miles in 3 hours, 41 minutes, and 13 seconds—average of 40.6 M.P.H.

AT NO time during the three gruelling heats of the Wood-Fischer race was it found necessary even to lift the hatches of the Nick Nack. Beneath these hatches, a Hall-Scott marine motor functioned perfectly, just as expected, during every second of the 150 miles.

Mogul Motor Bearings, too, functioned as expected in this famed marine engine, just as they always function in all Hall-Scott marine and aeroplane engines. Mogul bearings stand such exceptional wear and severe strains because they are built to meet them. Virgin metals—scientific selection and preparation of the correct formula—thorough mixing and refining methods—special processes insuring bearings with a solid, closely-knit grain, free from blow holes or porosity—all this, plus 100% inspection throughout the course of production are some of the main reasons why the Mogul trade mark on a bearing is an absolute guarantee against all trouble.

For 25 years we have manufactured bearing alloys, and for 15 years we have specialized in motor bearings. Surely the benefit of that experience can be of value to you. Let us make your test sets and help solve your motor bearing problem.

MUZZY-LYON COMPANY
DETROIT MICHIGAN



Mogul

Bearing Alloys *and* Finished Bearings

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Finding One's Way About In a Motor Boat

(*Continued from page 22*)

along more isolated coasts than ours where too much confidence might lead to disaster.

It should be remembered that red starboard hand buoys bear even numbers while black port hand buoys carry odd numbers. And that conical or nun-shaped buoys are starboard hand buoys while cans and cylindrical buoys are black. Spar shaped buoys are common to both sides of the channel. The fairway buoy black and white vertically striped, should be passed close aboard, while the danger or obstruction buoy, black and red horizontal bands, should be given a good berth.

The visibility of lights is computed for a height of fifteen feet above the sea, so a man on a motor boat will not see a light until well within its range of visibility. An occulting light is one where the light period is equal or greater than the period of eclipse, while a flashing light has a period of light shorter than that of eclipse.

An unknown white light seen at night should be avoided. It may indicate a wide variety of craft or obstructions from a mast-head light of a steamer to a rowboat.

A pilot to be successful must be a man of ability. He must possess an intimate knowledge of the whole coast along which he navigates, of its currents at all times, he must be able to handle his vessel as a row boat and know the rules of the road so well that he acts almost without thinking, for he trafficks where the commerce is heaviest.

On the Lakes we have pilots second to none in the world and on the coast they are as good. Mentioning the pilots on the Lakes recalls an incident that happened a few years ago and is worth repeating. A long file of steamers were plying as usual through the narrow channels between Lake Huron and Lake Erie when during a squall one of them parted or jammed her wheel ropes and came into collision with another steamer, which was sunk in the channel. There was only time to show a single white lantern from the forward part of the wreck, for coming up astern was a large steamer towing a barge. The captain and the mate of the latter steamer were peering vigilantly ahead in the blackness when they were startled by the unfamiliar light. The captain had but a few seconds to decide what to do, when from the invisible bank close aboard came a woman's voice, "Look out for the wreck, Cap'n." A quick helm and the steamer passed through the narrow opening between the wreck and the bank with only a few feet to spare. The bilge of the barge took the bottom at the edge of the channel, listed and slid along into the deep water in safety.

It might be interesting to work out a problem in piloting applying the various methods which have just been mentioned for locating one's position. Fig. 220 illustrates a problem of piloting on Long Island Sound which is not unlike the conditions met on many other bodies of water which are so popular for motor boating.

In piloting or running courses it is essential that one know the speed of his boat with considerable accuracy. The patent log is perhaps the most convenient method of determining the speed of one's boat. However, this instrument is not an absolute necessity inasmuch as by a little practice and experience one is able to determine the speed of his boat at different revolutions of the motor. This process of determining the speed of one's boat, of course, can be done in several different ways, the simplest of which is by putting the boat over a course of known length. A log should always be kept whenever one cruises in his boat. Enough data will soon be obtained so that the motor boatman will know with a good degree of accuracy the exact speed of his boat under various conditions of weather and sea.

In the piloting problem which follows dealing with Fig. 220, both methods of determining distance covered are included. If a patent log is used the readings of the log should always be checked by taking the time of passing objects, and then by measuring the distance on the chart between these objects it is possible to calculate the speed of the boat from this data. Although both methods are mentioned below, yet one should not get the idea that it is absolutely necessary to employ a patent log to carry on piloting, for this can be done by the other method alone if it has to be.

It is desired to sail from point A opposite Larchmont to a point at Q when Eaton's Neck bears S ½ E (See Fig. 220). The first step is to lay one's course, as it is called. The chart should be closely examined for depths and obstructions to navigation. A line or lines should be drawn on the chart to indicate the course which the boat is to take all the way from A to Q. It might be necessary to sail over a number of different courses in order to clear all obstructions. However, if one course can be laid out from starting point to destination so much the better. By examining the chart, Fig. 220, it will be seen that a straight line can be drawn on the chart which will extend from A to Q and will clear all obstructions such as Jackson Shoal, Duryee Middleground and the shoal water off Lloyd's Neck. Therefore it can be assumed that one's boat can safely take this course.

The next step is by means of a course protractor or the parallel rules to determine the direction of this course-line AQ by transferring the direction of this line to the compass rose by the method shown in Figs. 217 and 219. If this is done one will find that the magnetic direction which one must steer with zero deviation will be E ½ N.

We will assume that our boat has a speed of 8 knots which will require 7½ minutes to cover one nautical mile. Starting from a position A at 10 A. M., assuming no current, we head our boat E ½ N. The first chance we have to locate our position in order to check our course and speed and to determine whether we are really following the line AQ will be by taking a bow and beam bearing of the light buoy off Mamaroneck Harbor, lettered B in Fig. 220. Therefore, when buoy B bears 4 points on our port bow we will be prepared to note the time as well as note the reading of the log if we are using one. As our course is E ½ N, then 4 points off this course would be NE ½ N. So when buoy B bears NE ½ N from our boat we can assume that we are somewhere on the line BC. At 10:15 buoy B bears NE ½ N and the log reads 2.00 miles. We continue on this same course until buoy B is abeam or bears N ½ W. We again note the time, which in this case is 10.21, as well as the log reading which shows 2.8 miles. Therefore, as it has taken us 6 minutes to sail from C to D which, converted into distance, as the speed is 8 knots, we see the distance between these 2 points is 0.8 mile. Therefore, we know right off that we are the same distance off B in a direction S ½ E, that is 0.8 mile. From this, then, we can locate position D at once.

Continuing on our course of E ½ N our next chance to locate our position will be by means of cross bearings on Sands Point and Matinicock Point lights, lettered F and E on the diagram. A bearing is taken on light F and this bearing is found to be SW. At the same time a bearing is taken on light E which is found to bear E SE. Lines are then drawn on the chart in these directions and intersected at point G which must be our position. The log is found to read 3.3 and the time to be 10:25 A. M.

Matinicock Point light buoy is the next convenient mark for locating and checking our position. The method known as Two Bearings and the Run Between will be found convenient in this instance. The first bearing taken is found to be SE ½ E and we continue our course to some other point and take another bearing which we find to be SW ½ S. A log reading at the taking of the first bearing is 4.3 and the time 10:32. The log when the second bearing was taken read 6.3 and the time was 10:47. Therefore, the time between bearings was 15 minutes, which is equivalent to 2.0 miles. We now draw from point E, lines in the direction of NW ½ W and NE ½ N which are the reverse of the two bearings. With our dividers set at a distance equivalent to 2.0 miles and held in E ½ N direction, corresponding to the course of the boat, we locate points H and J, which are 2.0 miles apart, which gives us the two positions H and J which we sought.

The light buoy on The Cows, point L, gives us another opportunity of checking our position a little farther on. We decide to use the method known as doubling the angle. Therefore, we take a bearing of the light at L when it is 3 points on our port bow or bears NE ½ E from us. This locates our position somewhere on the line KL but does not give us the exact location of K. We continue on the same course E ½ N until the same light L bears 6 points on our bow or N x E ½ E. This gives us the line LM. The time and log readings were noted at the moment both the first and second bearings were taken and were 7.0 and 10.5 miles and 10:52:30 A. M. and 11:19 A. M. respectively. Accordingly, it is an easy matter to calculate the distance run between bearings which we find to be 3.5 miles. Therefore, our position at the time the second bearing was taken must have been 3.5 miles off the light L and in the direction S x W ½ W from the light. This locates the position M exactly.

Another check will be the location of point N when the light L is abeam or when it bears N ½ W. As the points D, G, H. J, and M have all been plotted on the chart and a line drawn through them which should be a straight line, if our sailing and observations have been accurate then point N should also be on this straight line continued, and should bear S ½ E from light L and a distance of 1.25 miles from point M. This distance is determined readily as the time and log reading at point M were noted as well as the time and log reading when light L was abeam.

The buoy off Lloyd's Neck will be another convenient means of checking our position, as our course as laid out passes this buoy close on our starboard hand. If the soundings had been recorded on the chart it would also be possible to locate our

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Finding One's Way About in a Motor Boat

(*Continued from page* 79)

position off Lloyd's Neck, as the shaded section indicates depths of 18 feet or less and the clear portion greater depths. Therefore, if a sounding was taken which at any time showed less than 3 fathoms we would know we were off of our course.

Our next problem is to locate the point Q, which should be reached by continuing our E ½ N course. As the shoals extend for considerable distance off Eaton Neck it is essential that we make sure that we will be far enough off when we are abeam of it to clear the shoal water. The method known as the 26½ degree—45 degree method—will determine this for us. A bearing is taken of Eaton Neck and when it bears 26½ degrees off our course or when it bears T SE, which is approximately 26½ degrees from the course of E ½ N which we are sailing. The time at which this bearing was taken is 11:46 and the log reading 14.2 miles. We continue to sail our course of E ½ N until the Eaton Neck Light bears 45 degrees from our course or bears SE ½ E. We find the time to be 11:56 A. M. and the log reading to be 15.3 miles. Therefore, we have sailed 1.1 miles between bearings, *i.e.*, from O to P. In this method the distance we have sailed between bearings will be equal to the distance off the light we will be when we are abeam of it if we hold our course. Therefore, when abeam of the light or when the light bears S ½ E we should be 1.1 miles off the light. Laying this distance off on the chart we find that it clears the shoals which extend out into the sound from the light and we are assured that we will be a safe distance off when abeam.

In the next lesson of the Correspondence Course, Piloting will be carried on further and numerous other navigation wrinkles included. One of the most important features of successful piloting, viz., tides and currents, has not been taken up in this lesson, but will be included in the next.

The following whose papers were received during September, have passed:

Lesson No. 1

Ed. L. Curbishley, Percy Edwards, Albert Fleig, Louis Preiss, John J. Rogers.

Lesson No. 2

Ernest Burks, Fred Cunningham, Ed. L. Curbishley, Percy Edwards, H. Greinert, Louis W. Preiss, Allen M. Russell, John J. Rogers.

Lesson No. 3

W. J. Cummings, Percy Edwards, H. Greinert, J. W. Lough, L. F. Merritt, C. A. Philpott, Louis W. Preiss, John J. Rogers.

Lesson No. 4

W. A. Baxter-Gould, Leslie Chapman, Percy Edwards, Elsie L. Fenton, N. V. Gillespie, Ralph Histand, J. W. Lough, L. F. Merritt, L. McKenzie, Arthur Peay, Homer Pritchett, Louis W. Preiss, Donald Spoor, Charles Vossbrinck.

Lesson No. 5

W.A. Baxter-Gould, H. R. Broll, A. R. Burr, L. F. Brown, Charles B. Downs, R. Finigan, F. D. Kelle, L. P. Larson, Joseph Reinhardt, W. S. Roedel, Edmund Roxby, O. A. Thomas, Charles Vossbrinck, Dr. H. E. Watkins, H. T. Zachgo.

Lesson Nos. 6 & 7

R. Andrew, Percy Benedict, Dr. A. B. Bennett, Joseph Bister, H. R. Broll, Charles E. Burch, Henry Byers, Dr. F. G. Brown, Michael Cibener, W. A. Cornell, Clarence W. Culver, F. H. Delano, J. Dunbaugh, I. S. Ellsworth, R. Finigan, Vincent Francis, J. A. Hain, George Hansen, J. Edwin Jones, L. P. Larson, George H. Leland, W. B. Landreth, W. B. Moores, Frank Mitchell, G. A. Patrie, Louis W. Preiss, John Reichester, Edmund Roxby, G. Schumakoff, Dr. J. F. Schefcik, F. B. Smith, H. R. Stiles, Morton Stelle, Miss S. Steinmetz, Charles Vossbrinck, Dr. H. E. Watkins, William O. Yates. C. S. Young, M. A. Young, E. T. Youngfelt, H. T. Zachgo.

Yard and Shop

(*Continued from page* 66)

B. T. Dobson, Naval Architect

We have just learned that B. T. Dobson, Naval Architect, for many years with W. H. Hand, Jr., has opened a designing office at 73 North Street, New Bedford, Mass.

The Wood-Fisher Trophy

The $5,000 Wood-Fisher Trophy, designed and executed by J. E. Caldwell & Company, is without doubt one of the most magnificent and artistic trophies in the world. The workmanship is perfect, as is always true of Caldwell's assignments.

Fishing in Florida

The Elco Works are prepared to arrange Elco Cruisettes particularly for Florida fishing.

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The
WRENCH
THAT CANNOT
BE MADE
BETTER

COES WRENCHES

They have been proven in every trade. We guarantee them unreservedly. We protect ourselves as well as the man who sells them, and the man who uses them, by putting the best there is, and nothing else into them. Ask your dealer.

Coes Wrench Company
Worcester **Mass.**

TRADE MARK
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No 64696
Coes

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Alligator, a 28-foot Tunnel Stern Cruiser

(*Continued from page* 34)

turned over at cabin sides and fastened, being covered by covering piece and half-round. All windows to be straight, none curved.

Bulkheads: Bulkhead at forward end of cockpit to be ½-inch tongued, grooved and V-d two sides mahogany, cypress or oak according to finish selected. Bulkheads at aft end of transoms to be ½-inch t. g. & V-d pine or cypress painted.

Companionway: Doors to be ⅞-inch oak or mahogany stiles and rails with ⅜-inch panels, hung with 2 by 2-inch fast pin bronze butt hinges and provided with bronze rim ships lock set. Sill 1⅛ inch with rabbet for door, casing to be ¾ inch, companionway coaming or runs to be 1 inch, slide ¾-inch pine covered with canvas and painted same as cabin top, slide framing to have ends slide in groove on inner sides of runs. Canvas on cabin top to turn up at companionway and be fastened on inner side of runs or coaming and covered by ⅜-inch covering pieces.

Steering Gear: A 24-inch steering wheel to be mounted with drum or chain and sprocket gear on bulkhead and 5/16-inch galvanized flexible tiller rope to be led along port side in back of removable sheathing through galvanized sheaves and fairleaders to 21-inch brass (or bronze) tiller secured to rudder. Turnbuckle to be fitted for taking up slack.

Rudder: To be 1-inch oak hung on brass or bronze rudder strap braces and supported at foot by brass pin passing through skeg.

Cockpit Coaming: To be ¾-inch oak or cypress or mahogany board in one width securely screwed to deck and shelf, lower edge being just below bottom of shelf. Below this coaming ⅜-inch tongued, grooved and V-d one side cypress, oak, or mahogany sheathing to be fastened to filling piece below shelf and to rabbetted sill on cockpit floor. Seam to be covered by 1-inch half-round to suit finish. On the port side this sheathing to be secured to nailing strips and the whole section of sheathing to be fastened by a few screws (round-headed) so that sheathing can be readily removed for access to steering gear.

Fuel Tanks, Etc.: Under the forward deck are to be fitted two fuel tanks made of No. 18 hard copper with carefully brazed seams, each tank set in copper pan provided with scupper overboard. Each tank to have vent, 1½-inch filling pipe threaded into brass deck plate and into bushing on tank, with outlet with gasoline cock and strainer.

Equipment: Two closed bow chocks fitted in chock rail. Two 3½-inch galvanized bulwark chocks fitted in rail aft. Flagpole sockets bow and stern with flagpoles and halyards. One 2½-inch galvanized chain deck pipe with box built under leading rope to locker. One dozen brass cup hooks. One-half dozen brass coat and hat hooks. One 8-foot boat hook. One 8-inch fog-bell. One fog-bell. One whistle of owner's selection. Awning complete built of ½-inch galvanized pipe set in sockets, each bow frame in one piece, bent at top each side, ½ by 2-inch spruce battens riveted to frames and covered with 10-oz. waterproof khaki duck with grommets fitting awning fasteners along edges, front and rear and side curtains complete. Celluloid windows in front and rear curtains. Three size No. 11 galvanized bitts. American Yacht ensign 2 ft. by 3 ft. Two ¾-inch manila docking lines. One 50-pound anchor to best suit anchorage conditions as to type with necessary length to suit cruising ground of 2¼-inch circumference manila rope. Six life preservers or more. One fire extinguisher. One 3-inch liquid compass mounted in binnacle as per plan. Set of oil burning and anchor lights. One two-burner stove of owner's selection. Portable, folding dining table. Two copies of Pilot Rules. Water closet of owner's selection (bow type recommended because of economy of space) properly installed in toilet room. Enameled iron 15-inch corner lavatory with basin pump connected with water tank. Cylindrical fresh water tank 10 inches by 48 inches installed in pine chocks under cockpit floor and provided with vent, filling pipe, outlet with shut-off, ½-inch galvanized piping led to galley pump and basin pump. Galley pump 2-inch size mounted on bulkhead over 12-inch by 12-inch enameled iron sink. Drains from lavatory and sink to enter same outlet through hull, this to be fitted with valve. Cushions filled with kapoc, covered to suit owner. Back cushions provided with necessary fittings for hinging up to form berth. Six rope fenders with 3-inch galvanized cleats for attaching. Refrigerator with one door serving both ice and food space. Ice pan with drain overboard. Food shelves removable gratings. Standard ice box hinges and lever.

Painting and Finish: Interior of hull to be treated to coat of raw linseed oil. Exterior of hull to be planed, sanded and given coat of lead priming paint and at least four coats of yacht white above the painted water-line and two coats of best anti-fouling paint below. Oak sheer ribband of 2-inch half-round to be painted white. Cockpit floor, deck fore and aft and covering board alongside of house and top of cabin house painted three coats at least of gray deck paint. If more fancy finish is desired covering board and deck may be finished bright. All exterior natural finish filled and given three coats of varnish.

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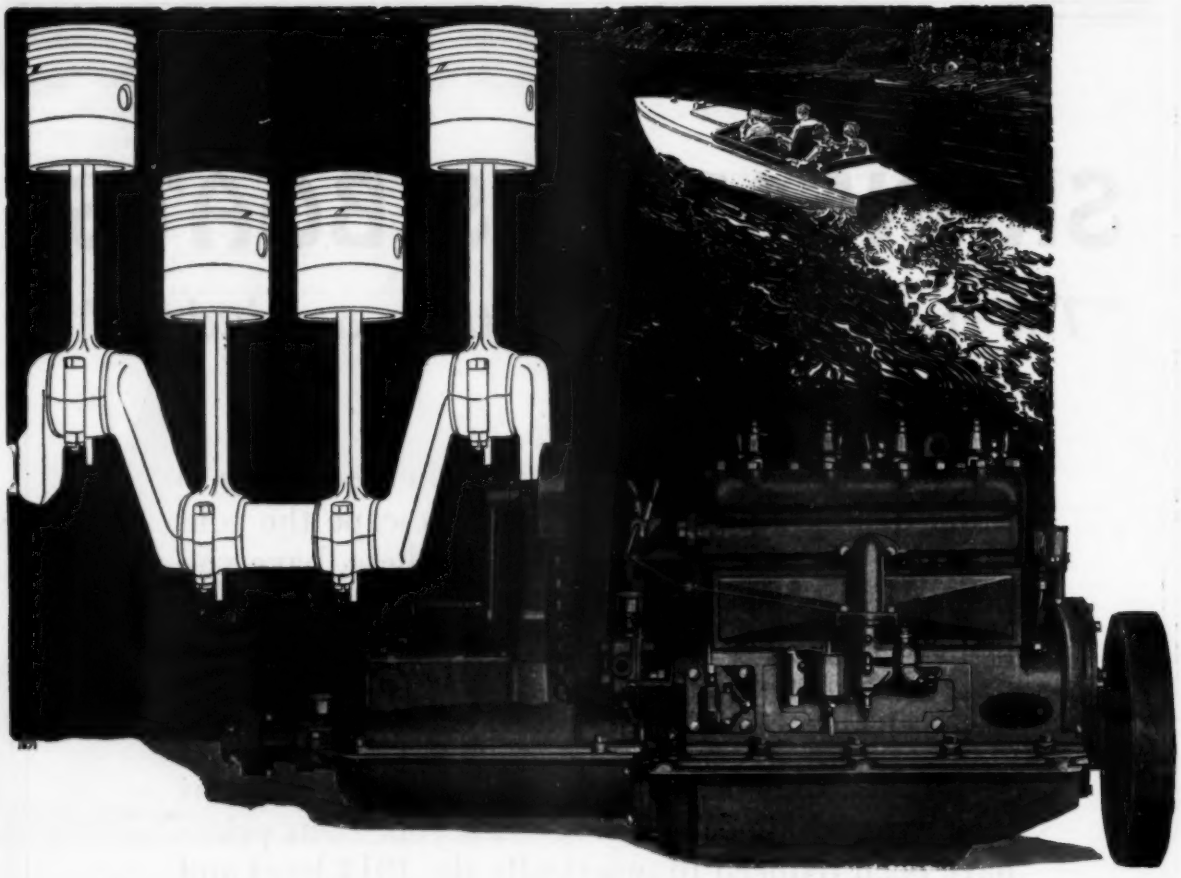

Four cylinders mean *real* motorboating

THE moment your boat is equipped with the UNIVERSAL four-cylinder, you've got a thrill coming to you in motorboating that you never knew before. Gone is the muss and tinker and noise and uncertainty that goes with ordinary engines—and now comes the quiet, the smoothness, the luxury of this famous, dependable power unit.

Only those who have graduated from the ordinary motor to this UNIVERSAL satisfaction, can realize what its ownership means.

The UNIVERSAL is the recognized standard, four-cylinder, 9-12 h.p. marine engine for 80% of all types and sizes of motorboats—from the small high speed runabout to the larger family launch—and for dories, fishing boats, work boats, etc.

It is built completely in the Universal factories and backed by 22 years of engine-building experience. The whole world knows its quality and reliability — for every continent of the globe has Universals in use.

Get your Universal engine now. Its cost is surprisingly reasonable and its worth makes it the most satisfactory investment you ever made. Send for complete catalog today, and tell us what kind and size of boat you figure on.

Universal

4-Cyl.
9-12 h.p.
MARINE ENGINE

UNIVERSAL MOTOR CO. Oshkosh, Wis.

Not connected with any other firm using the name "Universal"

Manufacturers also of the UNIVERSAL four cylinder, 4 k. w. and 2 k. w. Electric Plants for lighting boats, summer camps and homes, farms, etc. Send for catalog.

Advertising Index will be found on page 104

Scripps Motor Shows Up Well in Test

(*Continued from page* 25)

so we decided upon that as most nearly a typical one.

The starter was stepped on and the motor began firing at the first turn. It was run idle for a few moments to warm up and then connected to the waterbrake. The first reading was taken with the motor turning 800 r.p.m. and the scale reading showed that she was pulling 30.8 h.p.; at 1,000, 39.2 h.p.; at 1,200 r.p.m. 47.4 h.p.; at 1,400 r.p.m. it showed 53.5 h.p.; at 1,800 r.p.m. the reading was a shade over 60 h.p.

During the entire test the motor ran smoothly with very little vibration, could be throttled down to run very slowly and had a very rapid acceleration.

After the first test another make of carbureter was substituted and the horsepower developed was considerably better. At 600 r.p.m. the motor was pulling 24.6 h.p.; at 700, 29.05 h.p.; at 800, 33.6 h.p.; at 900, 37.8 h.p.; at 1,000, 42 h.p.; at 1,100, 46.75 h.p.; at 1,200, 51 h.p.; at 1,300, 55.9 h.p.; at 1,400, 60.2 h.p.; at 1,500, 63.75 h.p.; at 1,600, 67.2 h.p.; at 1,700, 69.7 h.p.; and at 1,800, 69.3 h.p.

The results of the two tests will be found plotted on page 25.

The Way We Would Do It

(*Continued from page* 30)

or nine inches from the bottom. A horizontal brace to support the legs is made with brass clips as shown. Brass hinges should be used to fasten the leaves to the table and rubber chair tips can be applied to the bottom of the legs to prevent them from slipping when the boat rolls. A raised lip can be attached all around the edge of the table to prevent dishes, etc., from sliding off in bad weather. This can be ⅝ inch high and ¼ inch thick with rounded edges. There should be no trouble in building this table in a size to suit the needs of your boat. The sketch makes everything very clear.

On the Cruise of Tasman

(*Continued from page* 35)

these islands, constantly on the alert for guano deposits and phosphates, of which there are large uncharted deposits.

The navigator on this voyage was Captain J. S. Drever, a native of the Orkneys and a skilled sailor of many years' experience on the steamships in the transpacific mail boat service.

The voyage itself was one continous round of adventure. The weather at the beginning was moderate for a short time and when Conway Reef was reached, after four days, the seas were so tremendous that a landing could not be attempted. During the afternoon the wind increased to gale force and the dinghy was washed overboard. It was recovered by Mr. Morrisby, who dove overboard with a tow-line and secured it, after which it was towed astern. The swimming ability of the owner was called into play on several occasions, but this feat was particularly hazardous under the weather. In speaking of it afterwards, Captain Drever stated: "I couldn't help laughing, Logan looked just like a kewpie doll, minus a sash, aboard a walnut shell sliding down Niagara, bailing for dear life with an old kerosene can." Later in the same evening the tow-line parted and this time the dinghy was lost for good. Morrisby was willing to go overboard after it again, but the task of securing a dinghy in the dark of night during a tropical storm was hopeless. The storm continued to increase in fury and it was finally decided to lay-to on a sea anchor. This helped for a time until the sea anchor carried away. Another was improvised and put out. For several days much punishment was suffered while riding to this anchor through the increasing gales. The second sea anchor finally carried away also and a third had to be improvised. For ballast for this an old kerosene can weighted with old pieces of iron was used. The weather shortly began to clear and Hunter Island was sighted indicating that the vessel had drifted for about 122 miles during the six days of the gale.

While trying to reach Hunter Island, just before dark, Morrisby performed his second stunt of real daring in the water. Right after starting the engine, it stopped and could not be turned over. Knowing the motor as he did from his years of former experience with it, Morrisby knew that something must be wrong with the propeller. So with just a light line to him, overboard he went and found that the dinghy tow-line had wound up in the propeller after the dinghy had been lost. Just try to picture a man going overboard to free a propeller during a storm of that nature. It is hard enough to do while a boat is laying quietly at her mooring in a sheltered harbor, but just picture Morrisby, one hand on the shaft, one minute up in the

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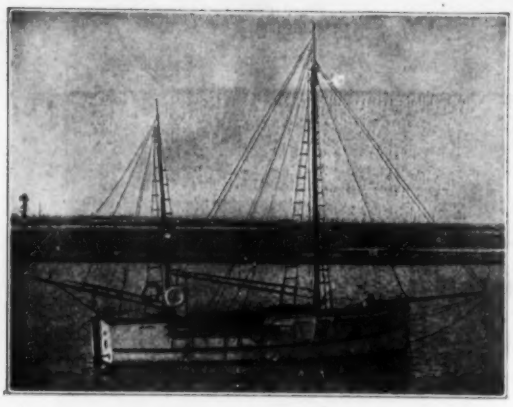
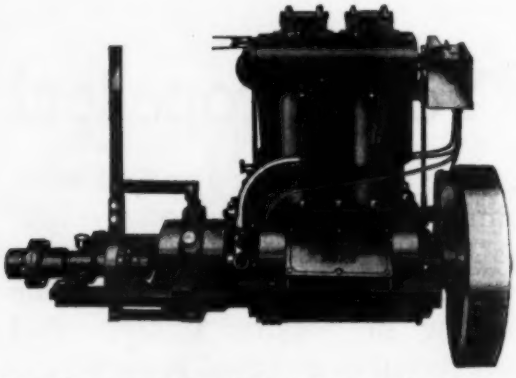


The Tasman is a 33-ft. auxiliary ketch built three years ago at Navau, Fiji Islands, to cruise the South Seas.



The engine is an ordinary 2-cyl., 16 H.P. Frisbie Valve-in-Head Motor, with kerosene equipment; same type and construction as in daily use in thousands of commercial and pleasure boats.

Frisbie
VALVE-IN-HEAD
MOTOR

10 Models: 1-6 cyl.; 5-75 H.P.

From Fiji Islands to Australia with a Frisbie

POWERED by her sturdy Frisbie, the stout little Tasman fought her way through 2,800 miles of storm-swept South Seas from the Fiji Islands to Sydney, Australia.

It was a voyage to try the staunchness of both boat and equipment. Surely, an engine able to battle successfully against such odds is worthy of the respect and confidence of any boat owner.

We have never yet heard of a "friendly" Frisbie backing down on any job it was asked to tackle. If you are looking for an engine that is in the habit of "making good" every time and all the time, write for the Frisbie catalog and name of nearest dealer.

Frisbie Motor Company
7 COLLEGE ST.
MIDDLETOWN, CONN.

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On the Cruise of Tasman

(*Continued from page* 94)

air, the next buried beneath heavy seas, cutting away with a knife to free the propeller. All of you who have ever done this same stunt under favorable conditions will better understand the credit deserved by Morrisby for his successful accomplishment of this task, under the conditions in which he had to work.

Later under the welcome lee shelter of Matthew Island the first real meal in a week was prepared, followed by a real sleep. It had been the intention to go ashore here to secure new spars for service in sea anchors in future gales, but the deserted island did not afford facilities for this as the dinghy had been lost and the waters in the vicinity of the boat were alive with hungry looking sharks, so this idea was abandoned. The remainder of the voyage, while full of enough of excitement to fill the life of any ordinary individual, was not thought to be enough out of the ordinary by these adventurers to be worthy of mention. Forty-four days after leaving Suva, Tasman reached Sydney. As she peacefully lies in Cook's River, none the worse for her buffeting she is a true member of the family of Frisbie and I. The two smartly dressed men sauntering down Pitt street would never be suspected as having brought Tasman successfully through the unprecedented spell of bad weather through which she came.

KEX II

(*Continued from page* 14)

the field windings on the generator are cut out that our compass may not vary one hair on fog runs across the Bay of Fundy. Go below and turn a lever and draw a bath of invigorating hot salt water. Stand beside the wheel and revolve charts covering the New England coast by turning a bronze crank. At night press a little switch lighting an opaque square under just that section that is on your course. The riding and running lights have telltales on the control board that place tiny spots of light on the instruments. Needless to say she has a searchlight that puts a mean eye onto remote buoys and a horn that commands respect in a fog. She has gasoline tanks and reserve tanks and duplicate fuel lines and strainers, two systems of ignition, oil tank to carry a season's supply, two sets of storage batteries, Delco generating set and all that sort of comfort.

Kex starts off with a galley with a coal range that makes good food and good cheer and that burns up the ice in the refrigerator. Then comes a fourteen foot main saloon with Pullman berths for overflow guests, a small toilet room, lockers of every conceivable size and shape and a writing desk concealing a hundred and eighty gallon water tank. Between saloon and engine room is a solid watertight bulkhead. Above the engine room is a fourteen foot deckhouse, whence companionways lead to all compartments. The wheel and controls are forward with plenty of lounging space aft. This deckhouse is built up with airplane plywood mahogany panels and frameless plate glass drop sash. It is very light to keep down top weight but strong enough to stop solid water in the ocean tide-rips off Grand Manan. The engine room houses all mechanical equipment, a handy work bench and a berth for the cook. If your distinguished editor would pub- d fain write a castigation of all motor manufacturers. They spread themselves on paper about their wonderful testing and inspection and then put out motors with the carbureters full of brass machine chips, reverse gears that won't reverse, magneto breaker contacts set on the skew and exhaust valves that freeze open two or three times on every cylinder until they are draw-filed down to a running fit. If the makers could only be made to live with their machines a few weeks at sea they would not stop off at designing a high grade motor but would see to it that they left the shops ready to run. Please do not expurgate this line, Commander Chapman, it is good for their souls.

Aft of the engine room and another watertight bulkhead is the owner's stateroom. In it and unsuspected are the gasoline tanks and oil tanks, all fillable from the deck through pressure tight two inch leads. The berths are three feet wide with special box springs, two dressers, a large closet and that inseparable companion to every well groomed woman—a cheval glass. Then comes a bathroom, a real bathroom with a tub big enough to keep decent on a cruise. This is followed by a guest stateroom, a smaller counterpart of the owner's cabin. In the stern is the lazarette with a bunk for the nine-year-old, space for odd dunnage and with the ball bearing hung rudder head with its sprocket chain and ball bearing steering connections easily accessible. An after deck, patronized only by the moon-struck, completes the picture of a very seaworthy sixty footer. As an anti-climax I will tell the world that she makes nine knots!

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"A Kermath Always Runs"

KERMATH

Kermath Wins Time Prize in Scripp's Reliability Classic

THE wonderful performance of the 40 horsepower engine in the Namid is the talk of all the boat world at the present time. The Namid won the time prize in the famous Scripps Reliability long distance classic from Rocky River to Put-in-Bay.

She also made the fastest time that has ever been made in any Scripps trophy race. She was rated at 850 revolutions per minute and every thirty minutes the official observer of the Cleveland Yacht Club took the revolutions of the engine and never once did he have to report that the revolutions had fallen one iota.

This same boat tied for third place in the Sallan Trophy Race at the Detroit Regatta, September 6th, against a large field of entries.

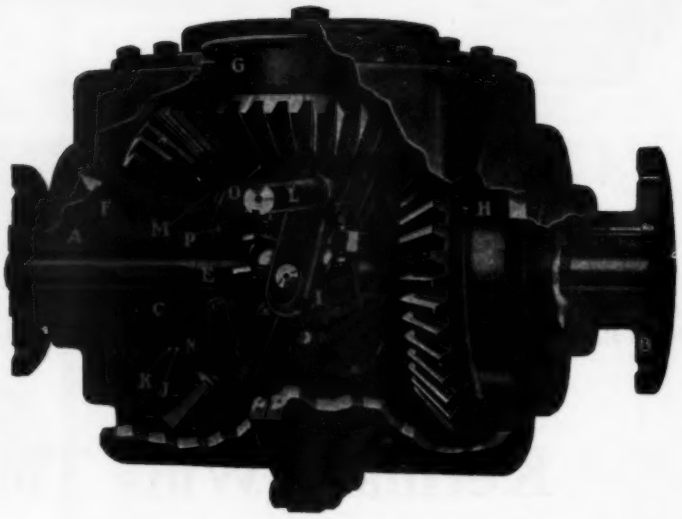
Such is the usual and regular performance of the famous Kermath motor. It is the motor you should have in your boat for it always can be relied upon under the most trying circumstances.

If you are looking for a marine engine that will give service—steady, dependable service—do not fail to look up the local Kermath dealer, and in the meantime write our Dept. D for the Kermath booklet. It has the information that you are looking for and lists the full line of Kermath Motors, 4 horsepower to 40 horsepower, $230.00 to $1650.00.

KERMATH M'f'g Co.
DETROIT 5880 Commonwealth Avenue **MICHIGAN.**

McKinnon Reverse Gear

Revolutionizing the Accepted Principles of Reverse Gear Design



BEFORE the appearance of the McKinnon Reverse Gear all the prominent gears on the market were simply variations of the old planetary gear principle—a type of gear discarded for automobile transmissions fifteen years ago, for all except the cheapest cars.

The planetary gear means a multitude of small gears with small teeth, small bushings, small pins, small parts, all subject to rapid wear and easy breakage.

Contrast this with the McKinnon Gear which has only three big sturdy bevel gears. These gears have large strong teeth with broad contact faces. Breakage is out of the question and the wearing faces are so liberal that these gears will run for years without wear, looseness, back-lash or noise.

Two big nine-plate multiple disc clutches control the forward and reverse drives, a separate clutch for each direction. The friction surfaces and capacity of these clutches are so great that you can reverse instantly at full speed, the clutches slipping enough to avoid any shock to the gears or the engine.

The McKinnon Gear has been thoroughly tested in heavy commercial boat service during the past three years. Furthermore a laboratory test on the Sprague Electric Dynamometer was conducted by Prof. Vose, Case School of Applied Science, Cleveland. A report of this test will convince you that the McKinnon is the strongest, most durable, most reliable gear on the market. Let us send you this report.

Four Sizes Ready for Delivery

No. 1 transmits 4 H. P. per 100 R. P. M.
No. 2 transmits 8 H. P. per 100 R. P. M.
No. 3 transmits 13 H. P. per 100 R. P. M.
No. 4 transmits 20 H. P. per 100 R. P. M.

Other sizes in construction
Absolutely guaranteed for one year

McKINNON IRON WORKS COMPANY

ESTABLISHED 1880

ASHTABULA OHIO

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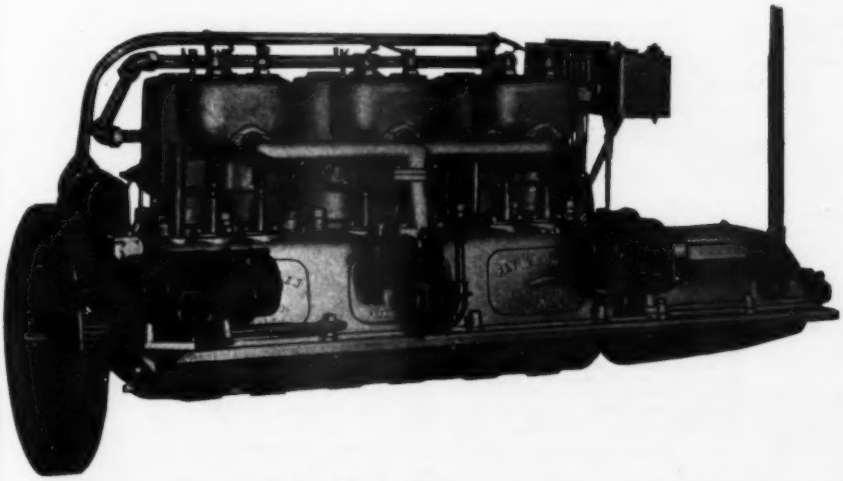
That "FEELING OF SECURITY"

(*and he says two full seasons!*)

VANETTA, a 40-ft. Cabin Cruiser, Powered with a Fay & Bowen L-64

MR. VAN COURT CARWITHEN of 300 Chestnut St., Philadelphia, is the owner of VANETTA. In a letter to us dated Sept. 21st, 1921, Mr. Carwithen says:—

"I am enclosing you a picture of the Vanetta, a 40 ft. cabin cruiser equipped with one of your L-64 engines. This engine has now been in operation for **two full seasons** and I am glad to say that it has never been necessary for me to make one single adjustment to the engine, nor during that time have I ever had one particle of trouble. It has been a great source of pleasure for me to drive the boat with this engine in it, and the **feeling of security** that your boat is always going to do exactly what you ask it to do, is one that makes boating indeed a pleasure."



Model L-64. 6-cyl. 5 x 6¼ with electric starter

FAY & BOWEN ENGINE COMPANY

104 LAKE STREET, GENEVA, N. Y., U. S. A.

NEW YORK: 44 Third Ave. at 10th St., Sutter Bros., Representatives
PHILADELPHIA: 116 Walnut St., Marine Equipment & Supply Co., Representatives
BOSTON: 84 Atlantic Ave., Gray-Aldrich Co., Representatives

MoToR BoatinG Advertising Index

Ten Seconds or Ten Minutes

There are lots of ways of making an electrical connection—everything from wrapping a bare wire around the binding post and trusting to luck—to a painstaking solder job that takes a good ten minutes, even if you have the iron hot and all the materials at hand.

For time saving and all around common sense, compare this with the new

Rajah Solderless Terminals

that can be connected up in ten seconds—a perfect electrical connection without solder or tools,—a connection that lasts until you want to change it—and is as quick to take apart as it is to assemble.

Yes a terminal is a small thing to be sure, but it's mighty important. A poor terminal or imperfect connection can cause as much annoyance, and waste as much of your good time to discover, as many troubles that are far more serious and more costly. So the man who courts trouble by neglecting to provide proper terminals for every connection deserves the bother that is sure to be his, sooner or later.

(Actual size)

Thrust Clip — Hook Clip — Ring Primary — Assembly to Cable

To attach the Rajah Solderless Terminal, you simply strip insulation back about 3/16", insert the wire into ferrule, and screw down the pointed part. You can see by the illustration how the strands of wire spread evenly in the bottom of the ferrule and are gripped like a vise, giving a perfect continuous path for the weakest current. And it can never shake loose or pull out.

The Rajah Solderless Terminal is just out. If your dealer hasn't it yet, send us his name and 15 cents for a sample, or order enough to equip all of your spark plug wires and any other place where you can use it. State sizes and types wanted.

Rajah Solderless Terminals are a development of the celebrated Rajah Terminals shown below, which are the best known, most popular, biggest selling terminals ever placed on the market. Regularly used by nearly all manufacturers of high grade marine engines, automobiles and electrical equipment.

Standard Cable Sizes:

5 M.M., 196 — 7 M.M., 275 — 9 M.M., 354

Thumb Nut — with all Rajah plugs unless Ball or Stud type preferred

Regular Fits any size cable

Thrust — Hook Furnished with ferrules to fit any size cable

Primary Ferrules to fit cables up to ½"

Keeps connections dry Protects against shocks Fits any plug or coil

Waterproof Shockproof Breakproof

RAJAH SPARK PLUGS

If your engine is not equipped with a full set of Rajah Spark Plugs you don't know how reliable and trouble proof your ignition can be. They are simple and easy to take apart for cleaning, honestly made with the very best materials obtainable, and their merit has been proved by more than twenty years of popularity. They make **ignition absolutely sure.**

The Waterproof Rajah Plug is ideal for exposed engines in open boats, and for outboard motors. Price $1.50 each, all threads. If your engine is protected you will get thorough satisfaction from the Rajah Standard Plug ($1.00 each, all threads) or the Rajah Giant ($1.25 each, all threads).

If your dealer does not have them, write us.

Manufactured by Rajah Auto Supply Co., Bloomfield, N. J., U. S. A.

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